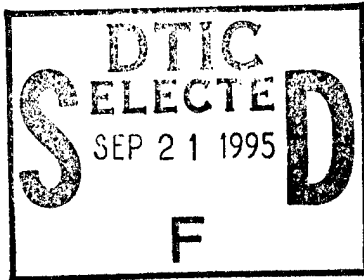AD_____

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Hospitalization Rates for Military Women:
Feasibility and Design of a Tri-Service
Relational Database Architecture Allowing
Service-Specific and Tri-Service Reporting

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Frank C. Garland _Aug 28, 1995_
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-3-

TABLE OF CONTENTS

Abstract

This project was initiated in response to the Congressionally mandated Defense Women's Health Research Program to advance women's health research and to design, develop, and maintain databases necessary to support research in women's health. An Institute of Medicine report in response to this mandate recommended that such databases should include armed services women in epidemiological research on gynecological conditions and other disorders of special concern to women. Close collaboration with the Air Force on data architecture and design was initiated and maintained throughout the project. The Navy research database has been completely assessed, documented, tri-service mapping of variables has been completed, and parallel databases have been developed for Navy officers and the Marine Corps. The services (Navy, Air Force, Army) cooperated in developing common terminology and procedures for tri-service reporting of incidence rates of first hospitalizations of active-duty women, including common algorithms and a standard population for determination of age-standardized incidence ratios, and a collaborative tri-service prototype epidemiological study was developed.

1.0 INTRODUCTION

In 1993, Congress mandated epidemiological studies of the health status, medical care, and occupational and environmental exposures of women in the military, called the Defense Women's Health Research Program (DWHRP). In response, the Naval Health Research Center in San Diego, California, initiated a project to develop standardized statistical techniques and methods for reporting of incidence rates among the three services. This is a report of the initial results from this project, which is currently ongoing.

This DWHRP project is designed to support the informatics requirements of comprehensive epidemiologic research on a large population of women in the military in an operationally deployed situation. The Congressional Committee that established the DWHRP in 1994 commended the Department of Defense in 1995 "..for its development of a program that focuses on epidemiologic research and database development; standards and policy issues; and solutions-oriented research". Specifically, the Committee stated that the 1995 program shall include "...epidemiologic research regarding women deployed for military operations, including research on patterns of illness and injury, environmental and occupational hazards (including exposure to toxins), side-effects of pharmaceuticals used by women so deployed, psychological stress associated with military training, deployment, combat and other traumatic incidents, and other conditions of life and human factor research regarding women so deployed".

At the request of the U.S. Army Medical Research and Materiel Command, the Institute of Medicine (IOM) convened a Committee on Defense Women's Health Research and developed a report entitled "Recommendations for Research on the Health of Military Women", published in August of 1995. This report provides broad research guidelines which specify what the DWHRP research topic areas should be: (1) unique to military women, (2) especially prevalent among military women, and (3) related to the ability of women to perform their mission. These guidelines have been set to ensure both military relevance and high scientific quality. The population of women now in the military allows gender-specific studies to be conducted with a reliability not possible before. Consequently, the IOM found the DWHRP to be an "invaluable means of improving the health of military women and of women in general."

This development of this research database, a major project within DWHRP, will support coverage of the entire military population, incorporating longitudinal files to provide the means for reporting basic health measures such as illness and injury rates and to serve as a resource for future studies. Initial steps toward this goal include enhancing existing systems; performing quality assessment, consistency edits, and relevance tests against selected existing available data sets; developing new sub-systems; and, building communication links between the services. This project is interrelated with several other major efforts under the DWHRP and directly interactive with two: (1) the Women Aboard Navy Ships project, and (2) the Epidemiology of Illness, Injury and Attrition Among Select U.S. Military Training Female Populations project.

The DWHRP Tri-Service Database Project has allowed the identification of women assigned to ships through review of longitudinal computerized career history files for active-duty Navy personnel which have been developed in collaboration with the Women Aboard Navy Ships project. Women assigned to serve aboard particular ships are linked through the identification of the duty

station code to which the woman was assigned. Demographic information for ship personnel could then be determined, including age, race, pay grade, and occupational designation. This greatly facilitated study population identification and the matching of men serving aboard the same ship, and facilitated development of individually-specified, self-administered questionnaires on many of the ships surveyed.

1.1   Background.

In recent years, both the percentage of women in the military and their involvement in active deployment and combat has grown. As a result, women's health needs, including patterns of illness and injury environmental and occupational hazards, and psychological stress has become a greater component of the work load. In response to the guidance of Congress and the recommendations of the IOM, a multi-service proposal was submitted in August of 1994 to explore the feasibility of a relational database capability that would allow service-specific and cross-service reporting of incidence rates of hospitalization of active duty women, and that would designed and developed specifically to promote medical exchange.

1.2   Goals.

The primary goal of this project was to demonstrate the feasibility of a multi-service database architecture which would allow reporting of comparable illness and injury rates among the services. It was acknowledged that, before joint-service medical research could be performed, differences in database formats, naming conventions, coding, and standardization of research methods to be employed in joint research endeavors would have to be accomplished. This project was specifically designed to address these requirements in three broad undertakings: (1) assess the quality and utility of selected existing longitudinal databases, (2) modify existing systems to support feasibility studies, and (3) design and execute a prototype multi-service epidemiological study to test the feasibility and utility of performing both cross-service and service-specific analyses.

A plan was developed to allow service-specific systems to evolve to the point where a common data structure could be created and routinely used for service-specific issues, but that would also support multi-service reporting of (for example) hospitalization incidence rates. This plan expanded the three broad goals of this project into seven specific objectives: (1) allow comparative epidemiologic studies of women's health across services, (2) develop research databases that would be geographically separated, maintained, and controlled by each service but would adopt a common format to facilitate joint research endeavors, (3) develop a multi-service common data format incorporating comprehensive medical information from a variety of data sources, (4) refine the common format to support sharing of data in a timely manner, (5) define all primary data sources, to be included in the expansion of the Navy's existing longitudinal database and the Air Force's development of a relational database system, (6) identify and standardize core data elements across services and, where standardization was not practical, to provide mappings of variables across services and, (7) create a basic infrastructure for epidemiologic study design within and across services, including cohort identification and follow-up, development of sampling schemes, case identification, and data verification.

Quality assessment of existing databases. During the development phase of this project, it became clear that quality assurance of existing data resources was a prerequisite to joint service epidemiologic research. This resulted in the establishment of a goal of verifying validity of key data fields that were critical to reliability of the findings. Such validation was carried out using existing data resources for cross-checking identity, age, gender, duty status, loss codes, and other key variables.

Modification of existing systems. During the August 1994 tri-service workshop, it became clear that each service had a different capability for capturing information. While agreeing with the desire to develop specifications for a tri-service collaborative data communications infrastructure, but recognizing that there were differences in approaches, needs, and development status between the services, the Navy and the Air Force agreed that they would jointly pursue the DWHRP project.

The prototype project would use existing systems, service-specific data sources, operating systems and programs to the greatest extent possible. This would involve extensive cross-mapping of variables to bridge the multiple databases and their divergent coding in accordance with existing DoD standards. Joint studies would then become feasible while preserving the service-specific conventions and overall autonomy of each service.

Development of prototype study. In order to demonstrate the feasibility and utility of cross-service reporting, the Navy designed a research study to investigate eight conditions unique or pertinent to active duty women. The resulting study, entitled "Cooperative Prototype Tri-service Age-specific Study of Selected Disease Incidence in Military Women Using Inpatient Hospitalization Data," is contained in Appendix B.

To achieve the seven project objectives, the Navy initiated work (1) to expand their existing database to include active-duty Navy officers, Marine Corps officers and Marine Corps enlisted personnel; (2) to enhance the architecture of the longitudinal database to allow inclusion of outpatient visit and laboratory test data; (3) to fully assess and document the existing Navy enlisted career history and health events (hospitalizations, outpatient visits) database and generate incidence and first hospitalization rates, so that compatible Army and Air Force systems could be developed; (4) to facilitate a series of joint workshops to explore the feasibility of developing compatible multiple service-specific relational database systems and develop standardized methods for cross-service research and reporting; and (5) to demonstrate service-specific and cooperative multi-service research activities by conducting a cooperative prototype epidemiological study of health-related events in military women.

2.0   METHODS.

The primary focus of the Navy was to perform quality assurance on existing databases, to expand its existing longitudinal database, and to revise system documentation. The primary focus of the Air Force was to assess the feasibility of a relational database model which could be used by any service to manage its data. Because of the separate but complementary foci of the Navy and the Air Force efforts, it was agreed that they would leverage their respective efforts by pooling their

expertise. The Navy shared their accumulated knowledge of how to acquire relevant DoD data, how to convert it to a usable format, and how to build an event-based longitudinal structure. The Air Force capitalized on this during development of a relational database for medical research.

The Air Force and Navy agreed on the following methods to achieve their joint objectives: (1) The Navy would expand and the Air Force would create respective individually-based, longitudinal databases, (2) databases would have an event-based common data structure, (3) databases would incorporate comprehensive medical and demographic information from a variety of routinely collected data sources including hospitalizations, career history, HIV testing, and other events, (4) databases would be designed to include outpatient data, self-reported health surveys, stored serum sample information, access to laboratory data, tumor registry data, and other supplemental sources of clinical data, as these become available, and (5) each service would develop user-friendly interfaces for research use.

2.1   Quality Assessment the of Existing Databases.

The existing Navy database was examined for: (1) completeness of reference material, (2) reconciliation of demographic, medical, and service history data element references, (3) comparison of events (codes and descriptions) to the referenced event codes, (4) comparison of cross-referenced data elements to the corresponding derived variables, (5) comparison of geographic areas of accident or place of death codes to country or state code, and (6) inconsistencies needing to be rectified.

Existing database. The Navy's existing enlisted longitudinal database was initiated in 1975 to track enlisted Navy personnel career and medical history for research purposes. This is an event-based longitudinal research database which contains a record for each individual in the population and information on each career and medical event experienced by that individual. Currently, the system operates on an IBM 4381 mainframe system using a VM/CMS operating system. COBOL is the development language. These individually-based records follow personnel from entry into the service through their active-duty careers, and contain a set of unchanging demographic characteristics followed by a chronological set of events, each of which is accompanied by a set of descriptors. For example an event may be a career change such a promotion, the assignment of an occupation, or a change in duty station. Hospitalization data are also stored as events. A hospitalization would come with a set of descriptors such as discharge diagnoses, procedures performed, and length of stay. This event structure supports the calculation of incidence rate of hospitalizations by any of the other variables available in the database.

Quality assurance tracking. A quality assurance (QA) document was created to track the review and validation of data element values used within the existing Navy enlisted longitudinal database. The QA document was constructed based on DoD standards and was used to validate existing data elements and tables.

The Navy's longitudinal database has been built over the last 20 years. Its form and content have been driven by the evolving needs of the Navy research community over time. Technical documentation of the records and field structures in the existing longitudinal database has been maintained, but additional documentation was needed for the overall system operation. In addition, various documents needed to be organized into uniform data dictionaries containing data element

definitions for DoD source data input files and the Navy's existing longitudinal data files, as well as a listing of terms and acronyms. The DoD Automated Information Systems (AIS) Documentation Standards (DoD-STD-7935A) and the Federal Information Processing Standards Publication - Guidelines for Documentation of Computer Programs and Automated Data Systems (FIPS PUB 38) were selected as the guiding publications. A review of DoD-STD-7935A and FIPS PUB 38 was conducted to determine what additional documentation was needed. It was determined that the most critical components were the System Specification (SS) and the Data Requirements Document (DRD). These two documents would also provide the Air Force with a common format to follow in the development of their longitudinal research database. The DoD-STD-7935A System Specification standard includes the following components: (1) System/Subsystem Description, (2) System/Subsystem Functions, (3) AIS Equipment Environment, (4) Communications Environment, (5) Network Description, (6) Physical Interface, (7) Protocol Interface, (8) Applications User Interface, (9) Software Support Environment, (10) Software Interfaces, and (11) System Logical Flow. The System Data descriptions, definitions, and characteristics are contained in the Data Requirements Document.

The Navy database DRD developed by this project conforms to FIPS PUB 38 standards. The DRD describes database organization and storage allocation. It contains the data model of the logical and physical design. The DRD also contains a data dictionary for input file elements coming from DoD primary data sources and a data dictionary for internal Navy relevant data elements.

2.2   Expansion of the Existing Database.

The existing database was expanded to integrate Navy Officer and Marine Corps data and to allow the inclusion of outpatient and laboratory test data. New event code structures unique to these populations were designed. The additions were made by matching name, social security number and data of birth for each individual. Raw data were obtained on tape and parsed into the database. The data from DoD sources were converted to a common format to provide compatibility with existing longitudinal database formats. It was decided that the new expanded database housing Navy and Marine Corps data would be named the CHAMPS (Career History Archival Medical and Personnel System) Research Database. Figure 1 depicts the DoD source data input files that were incorporated into the expanded CHAMPS Research Database.

Figure 1.

DoD DATA SOURCES FOR NAVY AND MARINE CORPS
CHAMPS RESEARCH DATABASE PROCESS DIAGRAM

-12-
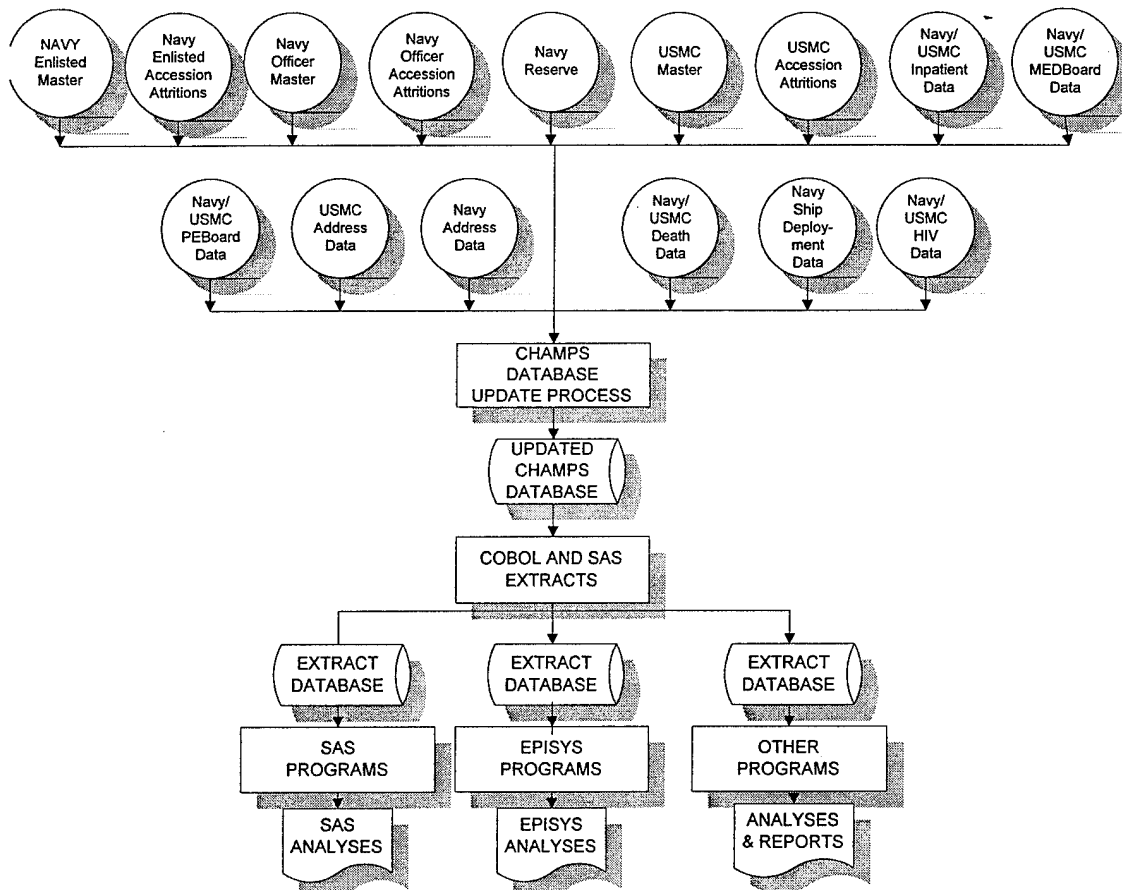
2.3   Development of Prototype Study.

In order to demonstrate the feasibility of conducting epidemiologic analyses across services, a set of studies was designed and conducted. It was agreed by the Navy, Air Force, and Army that incidence rates of hospitalization for eight diseases relevant to active duty women would be extracted for all the services for a five year period, 1990-1994. Each service would use its own resources to obtain these data. The Navy data would be extracted through the use of an existing Naval Health Research Center (NHRC) user interface called the Epidemiological Projection Interactive System (EPISYS). (Appendix E contains EPISYS technical documentation.) Currently under development, EPISYS would be used to produce Navy results for the prototype epidemiology study. It serves as a PC-based, user-friendly front-end to calculate counts and person-year based prevalence and incidence rates of first hospitalization from data on Navy enlisted active-duty personnel extracted from the CHAMPS research database. EPISYS contains arrays of counts of cases and population denominators, rather than entire individual records. This allows a user to rapidly obtain incidence data, perform age-adjustment, and display hospitalization trends with respect to significant Navy demographic, and personnel history cofactors. EPISYS currently produces counts and hospitalization rates for Navy enlisted personnel. It is designed to run on standard IBM 486 PC equipment in a DOS/WINDOWS environment, and has user-friendly menus for selection of variables and presents tabular and graphical displays of results.

Prototype epidemiology study. Two primary methods were employed to develop the prototype epidemiology study: (1) a review of the epidemiology literature and of previous Navy epidemiology studies, and (2) a convening of workshops to determine standard procedures for the three services' medical departments. A selection of the literature reviewed is presented in the Bibliography section.

3.0   RESULTS

From November 1994 through August 1995, the Navy and Air Force have jointly pursued the seven objectives established for this project. A series of workshops was held between December 1994, and August 1995. (Appendix A contains a list of the participants at each workshop.) In the August 1995 workshop, representatives of the medical research communities of the three services made presentations on the progress each service had made in implementing its respective data management approach over the previous nine months. A review of the results of the Air Force and Navy database project collaboration demonstrated that it is feasible for the two services to develop a common relational database architecture and interface. In addition, it was determined that common terminology and procedures for reporting hospitalization incidence rates were defined between the three services, and the hospitalization rates provided by the Army database system demonstrated that tri-service hospitalization rate comparability was achievable. The prototype epidemiological study included in this report represents the culmination of these efforts.

3.1   Quality Assessment of Existing Database.

The existing Navy database was examined for: (1) completeness of reference material, (2) reconciliation of demographic, medical, and service history data element references, (3) comparison

of events (codes and descriptions) to the referenced event codes, (4) comparison of cross-referenced data elements to the corresponding derived variables, (5) comparison of geographic areas of accident or place of death codes to country or state code, and (6) inconsistencies needing to be rectified. Tables 1 through 6 depict the results of this work.

Quality assurance of the existing database. A Quality Assurance (QA) document was created to track the review and validation of data element values used within the Navy enlisted longitudinal database. The QA document contains reference material used to validate existing data elements and tables with current DoD publications such as: U. S. Marine Corps Military Occupational Specialties Manual (MOS Manual) for the period 1985 through 1994; the Data Element Dictionary for the Officer Personnel Information System dated February 1, 1993; portions of the Data Element Dictionary - Navy Officer dated March 21, 1995; the Enlisted Master File (EMF) Data Element Dictionary dated 6 June 1994; and portions of the JUMPS/ MMSCODESMAN.

Reference Material for the Navy Enlisted Longitudinal Database Documentation File

Table 1

Reference	Data Element	Update Action
1. JUMPS/MMSCODESMAN	Religion codes and descriptions	Added 155 Religion codes and descriptions.
2. JUMPS/MMSCODESMAN	Component codes and descriptions	Added 61 Component codes and descriptions.
3. Data Element Dictionary for the Officer Personnel Information System dated 2/1/93.	DOD Loss codes and descriptions - Separation Program Designator.	Added 215 DOD Loss codes and descriptions - Separation Program Designator.
4. Accounting Category Codes from the Data Element Dictionary - Navy Officer dated 3/21/95.	Onboard Accounting Category Codes	Reconciled Onboard Accounting Category Codes. Added codes 355 and 356.
5. Race Codes from the Data Element Dictionary - Navy Officer dated 3/21/95.	Race Codes	Reconciled Race Codes.
6. Shore Codes from the Data Element Dictionary - Navy Officer dated 3/21/95.	Sea Shore Codes	Reconciled Sea Shore Codes.

Reference	Data Element	Update Action
7. Death Loss Codes from the Data Element Dictionary - Navy Officer dated 3/21/95.	DOD Death Loss Codes	Reconciled DOD Death Loss Codes.
8. Accounting Category Code Table - Appendix A from the EMF Data Element Dictionary dated 6/6/94. Added Code 323.	Onboard Accounting Category Codes	Reconciled Onboard Accounting Category Codes.
9. Country Code Table - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	Duty Station Location Codes	Reconciled Duty Station Location Codes
10. Country or State Code Table - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	Geographic Areas of Accident or Place of Death Codes	Reconciled Geographic Areas of Accident or Place of Death Codes. Some Country Codes are not in agreement. See Comments.
11. Death Reason Codes - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	DOD Death Loss Codes	Reconciled DOD Death Loss Codes.
12. Dependency Code Table - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	Primary Dependency Codes	Reconciled Primary Dependency Codes. Missing numeric codes for eight Married with Military Spouse categories.

Reference	Data Element	Update Action
13. Educational Certification/Designator Tables - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	Educational Certificate Codes	Reconciled Educational Certificate Codes
14. Enlistment Type Table - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	Type of Enlistment Codes	Reconciled Type of Enlistment Codes.
15. Reconciled Ethnic Group Codes to Ethnic Group Codes - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	Ethnic Group Codes	Reconciled Ethnic Group Codes
16. Homeport or Type Duty Table - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	Duty Station Homeport Codes	Reconciled Duty Station Homeport Codes.
17. Military Obligation Designator Table - Appendix A from the EMF Data Element Dictionary dated 6/6/94. - Tables are not in agreement.	Military Obligation Designator Codes	Reconciled Military Obligation Designator Codes.

Reference	Data Element	Update Action
18. Homeport or Type Duty Table - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	Event Codes	Reconciled Event Codes.
19. Homeport or Type Duty Table - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	DOD Loss Codes	Reconciled DOD Loss Codes.
20. Rate Abbreviation Table and Rating Table - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	Rate Codes - Navy Enlisted	Reconciled Rate Codes- Navy Enlisted.
21. Rate Abbreviation Table and Rating Table - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	Recruit Program/School Rates	Reconciled Recruit Program/School Rates.
22. Sea Shore Codes - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	Sea Shore Codes	Reconciled Sea Shore Codes.

Reference	Data Element	Update Action
23. Type Acquisition Table - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	Type Acquisition Codes	Reconciled Type Acquisition Codes.
24. Country or State Table - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	Reconciled State of Enlistment Data	Reconciled State of Enlistment Data.
25. Navy Loss Code Table - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	Attrition Indicators	Reconciled Attrition Indicators.
26. Ship Type Codes - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	Ships by Type	Reconciled List of Ships by Type.
27. Ship Type Codes - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	Duty Station (Ship Type)	Reconciled Duty Station (Ship Type)
28. Ship Type Codes - Appendix A from the EMF Data Element Dictionary dated 6/6/94.	Onboard Activity Codes (Ship Type)	Reconciled Onboard Activity Codes (Ship Type)

Reconciliation of Demographic, Medical, and Service History Data Element References

Table 2

Reconciled Data Elements

Table of Demographic Variables.

Table of Duty Station Transfers Event Codes 501-503.

Table of Service History Event Code 504.

Table of Hospitalization Event Codes 601-610.

Table of Medical Board Event Code 611.

Table of Physical Evaluation Board Event Code 612.

Table of Death Event Code 613.

Table of HIV Testing Results and Diagnosis Event Codes 660-679.

Events Codes Cross Reference

Table 3

Compared events (codes and descriptions to each page of the document that referenced the event codes.

a. Event Code Groups

  Accession Event Codes
  Desertions Event Codes
  Pay Grade and Rate Event Codes
  Name Change Event Code
  SSN Change Event Codes
  Extension Event Codes
  Duty Station Transfers Event Codes
  Discharge Event Codes

b. Military Obligation Designator Controlling Event Codes 101-111, 130-151, 181-188, 194-195, and 334.

c. Total Number of Impatient Hospitalizations Count Event Code 601

d. SSN/Name Change Events 301 and 344

e. Total Promotions Count Event Code 328

f. Total Demotions Count Event Code 327

g. Total UA/AWOL Count Event Code 392

h. Total Desertions Count Event Code 951

Compared events (codes and descriptions) to each page of the document that referenced the event codes.

i. Total Number of Medical Boards Count Event Code 611

j. Total Number of Physical Evaluation Boards Count Event Code 612

k. Attrition Indicator Event Codes 801 - 999 (13 event descriptions are not in agreement for the following codes: 806, 833, 932, 813, 887, 954, 955, 956, 957, 958, 959, 960, 961) Added codes 839, 879, 962-969. Thirteen codes were identified as obsolete during the comparison.

l. Recruit Naval Training Command Derived by Event Codes 101, 103, 110, 111, and 195. (Need to enter the year when NTC Bainbridge was closed.)

m. DoD Loss Codes (Severity of Navy/USMC Loss Code)

n. Type Acquisition Codes Controlling Event Codes 101-111, 130-151, 181-188, 194-195

o. Branch and Class of Service Controlling Event Codes 101-111, 130-151, 181-188, 194-195

p. Branch and Class of Service Last Discharged From Controlling Event Codes 101-111, 130-151, 181-188, 194-195, 801-998

q. Type of Enlistment Controlling Event Codes 101-111, 130-151, 181-188, 194-195

r. Enlisted Designator Code (USN Enlisted Only) Controlling Event Codes 101-111, 130-151, 181-188, 194-195, 334, 501, 502, 801-998. Added additional location in event format "26 for Duty Station Transfers". Reference: Service History Event Record for Duty Transfers. Code 334 is not listed in Event Codes.

Compared events (codes and descriptions) to each page of the document that referenced the event codes.

s. Onboard Activity Code Controlling Event Codes 191-193, 391-393, 501-502, 951. Event Codes relate to Desertion, Unauthorized Absence, and Confinement. Are these correct controlling event codes?

Compared events (codes and descriptions) to each page of the document that referenced the event codes.

t.	Rate Authorization Code Controlling Event Codes 327-330

u.	Effective Date of Pay Grade Controlling Event Codes 327-330

v.	"A" School Indicator Controlling Event Codes 327-330

w.	Nuclear Field Program Loss Indicator or Advanced Electronics Field Indicator Controlling Event Codes 327-330

x.	Old Last Name, First Name Controlling Event Code 301

y.	Old Social Security Number Controlling Event Codes 344 and possibly 998

z.	SSN Verify Controlling Event Codes 344 and possibly 998

aa.	Agree to Extend ADOS/ADOO Controlling Event Code 382

ab.	Operative Extension ADOS/ADOO Controlling Event Codes 383-384 where 384 is bonus

ac.	Involuntary Extension ADOS/ADOO Controlling Event Code 385

ad.	Reserve Active Duty Obligation Controlling Event Code 387

ae.	Original DoD Loss (Navy Enlisted) Codes Controlling Event Codes 801-998, Except 951

af.	DoD Death Loss Codes Controlling Event Code 952

ag.	Secondary Naval Enlistment Classification Code Controlling Event Codes 801-998, Except 951

ah.	Duty Station Planned Rotation Date Controlling Event Code 501

-23-

Data Elements Cross-Referenced to Derived Variables

Table 4

Compared cross-referenced data or items within the document.

Regular Reserve Code	Regular Reserve Indicator Regular Reserve
GCT to AFQT Conversion	Screen Score Mental Group
SPC Rate and Occupational Specialty	Recruit Program/School Recruit Program/School Rate Occupation Specialty
Derived variables	Event Code Explanation of Derived Variables
Branch/Class Codes	Regular Reserve Branch and Class of Service Branch and Class of Service Last Discharged From Codes 11-23 and 25-78
Enlisted Designator Code	Enlisted Designator Code - USN Enlisted Only Event Code Groups
Cause Codes	Refers Codes 50* through 99* to other elements in the document
Patient Category	Medical Board Record (Event 611), Physical Evaluation Board (Event 612), Death Record (Event 613). Hospitalization Record should be event 601-610 per Event Codes.

Geographic Areas of Accident or Place of Death Codes to Country or State Codes.
Table 5

Compared Geographic Areas of Accident or Place of Death Codes to Country or State Code Table - Appendix A from the EMF Data Element Dictionary dated 6/6/94. Some Country Codes are not in agreement.

Areas of Accident or Place of Death Codes

AS = Asia
AT = Australia
BG = British Guiana
CA = Canary Islands
CN = Canada
CT = Corsica
CD = Central African Rep
TW = Taiwan, Formosa
CF = Clipperton Islands
CR = Crete
DA = Dahomey
DE = Denmark
DO = Dodecanese Island
FT = Fiji, Tonga Islands
GE = East Germany
GC = Gabon
GY = Germany, Saar
IL = Iceland
JN = Jan Mayen Island
KS = South Korea
MA = Malagasay Rep,
MI = Marshall Islands
ML = Malta, Comino Is.
MT = Mauritania
MR = Mascarene Island,
NA = North America
NE = Netherlands

MU = Marcus Islands
PC = Pacific Ocean,

Country or State Code Table

AS = Australia
AT = Ashmore and Cartier Islands
BG = Bangladesh
CA = Canada
CN = Comoro Is.
CT = Central African Republic
CD = Chad
TW = China, Republic of
CF = Congo (Brazzaville)
CR = Coral Sea Island Territory
DA = Denmark
DM = Dahomey
DO = Dominica
FT = French Territory of the Afars and Issas
GE = Germany, Federal Republic of
GC = Germany, East
GY = Guyana
IC = Iceland
JN = Juan Mayen
KS = Korea, Republic of
MA = Madagascar Comoro Island
MI = Malawi
ML = Mali
MT = Malta
MR = Mauritania Chagos Island
NA = Netherlands Antilles
NE = Niue
NL = Netherlands
MU = Oman
PC = Pitcairn S. China Sea

-25-

List of Inconsistencies That Need to be Rectified.
Table 6

List of questions that require clarification or a determination for missing or questionable data.

Questions - Recommended Action

Is there a current NAVPERS 15,642?

1. Page 1.20 - Items 37-40 are out of order with effective dates. Item 46 is listed 3 times (last 46s should be 47 and 48).

2. Page 1.25 is missing information for Explanations of Derived Variables.

3. Page 1.30 - Navy and Marine Career/Medical History File Status - Needs to be updated.

4. Page 1.40 - Demographic Variables - Position 43 (Sea/Shore Duty Indicator (DEM_SS)). This item is not in the Index - Page 1.04 shows DEM_SSIN.

5. Page 1.50 - Service History Event Code 504 (Ports of Call) - Positions 1-5 (Activity Code for Ships (POC-ACTY) refers to Page 75.00. Page 75.00 describes Onboard Activity Codes with 10 positions in Event Format 51-60.

6. Page 1.70 - Physical Evaluation Board (Code 612) - Positions 19-21 (Extremities (PEB_EXTM) refers to Page 223.00. Page 223.00 describes the field as a 1 position field in Event Format 19.

7. Page 1.70 - Death Event (Code 613) - Position 40 (Admitted to Sicklist (DTH_SICK) refers to Page 219.00. Page 219.00 shows the field location in Event Format 22.

8. Page 1.76 - Discharge Event Codes - Positions 54-55 (Class Branch Service Last Discharge From (DIS_BRCL) refers to Page 71.00. Page 71.00 shows the fields located in

Answers - Recommended Action
_____

1.

2.

3.

4.

5.

6.

7.

8.

Documentation of existing database. To ensure validity and reliability of research results, complete descriptions of all available elements are required so that extracted variables and their associated values correctly represent the measures of interest. Therefore, the Navy selected the DoD Automated Information Systems (AIS) Documentation Standards (DoD STD 7935A) as the guideline for documenting this information. During the course of this project, extensive documentation of the system has been performed using this standard. The result is a revised set of DoD compliant documentation. (Appendices D and C contain the revised System Specification and Data Requirements Document.)

System Specification. This document provides information on the processes that must be performed, their interrelationships, and their frequency of occurrence. The SS also contains the DoD sources of data, points of contact, data set names, and flow charts of each process.

Data Requirements Document. The Data Requirements Document (DRD) provides technical descriptions for both static and dynamic information on individuals. This includes information such as variable names, definitions, coding, record positions and field lengths. Formats of all input files received by NHRC from DoD sources and the format of the Navy enlisted longitudinal database are contained in the Appendices of the DRD. The data from DoD sources are converted to a common format to provide compatibility with NHRC CHAMPS Research Database formats. The data elements that comprise Navy enlisted longitudinal database, are listed in the Data Element Dictionary, which is also contained in the Appendices of the DRD. Included with each data element is a description of that element, its source, and valid values for that element. Therefore, each Navy enlisted longitudinal database element is now well-defined as is the system architecture and the array of DoD sources providing primary data. This effort will optimize system maintenance, research validity and the eventual portability of data.

3.2   Expansion of Existing Database System.

Expansion and enhancement of the existing database to integrate Navy Officer and Marine Corps Data and to allow the inclusion of outpatient and laboratory tests data. To expand the existing Navy enlisted longitudinal database to include Navy officer and Marine Corps data, NHRC programmers modified the existing database structure, creating the database now referred to as the CHAMPS Research Database. Data acquisition required coordination with DoD organizations for the transmission of data. Conversion programs were written to translate the raw data into a common format required for data import and integration into the existing longitudinal database.

Expansion of the Navy's CHAMPS Research Database for the first time allows Navy versus Marine Corps comparisons, rate/rank comparisons, and an increased number of research subjects, thereby increasing the power of statistical tests. Figure 2 displays the expanded CHAMPS Research Database system components.

Figure 2

NAVY RESEARCH DATABASE (CHAMPS)
Career History Archival and Medical Personnel System

NAVY RAW DATA FROM DOD SOURCES

MARINE RAW DATA FROM DOD SOURCES

NAVY DATA QUALITY ASSURANCE

MARINE DATA QUALITY ASSURANCE

NAVY/MARINE DBMS ON IBM 4381 with DoD STD DATA DICTIONARY

PC/MAC FRONT-ENDS (SAS, EXCEL, EPISYS) EXTRACTION AND ANALYSES

PC/MAC WORKSTATIONS

STATISTICAL ANALYSES, GRAPHICS AND REPORTS

The entire Navy enlisted longitudinal database Documentation File was reviewed. Field descriptions were corrected (i.e., numeric, alphabetic, alpha/numeric) in the definition of data elements where applicable.

Facilitation of Inter-service communication and cooperation. As part of this project, the Navy hosted three workshops to which representatives of the Navy, Air Force and Army were invited. These workshops provided a venue for exchanging information about system design, data sources, data retrieval mechanisms, the feasibility of data sharing, and the specification of standardized methods for conducting joint research. The three workshops were held at the Navy Health Research Center (NHRC) in San Diego. Participants at these workshops helped to identified issues, appointed ad hoc work groups, and selected standardized terms and procedures

for reporting out hospitalization rates across the services. Navy and Air Force computer analysts held a fourth workshop at the Defense Manpower Data Center (DMDC) in Monterey, California to define data accession procedures. (Appendix A contains a list of the participants at each workshop held in San Diego, California.)

Participants examined the feasibility and possible mechanisms for enhanced data sharing across the services, and with other organizations. Agreement was reached on how to approach this goal, maximizing the use of available resources. It was decided that a "one size fits all" database was not practical, each service has unique data elements not shared by or pertinent to the other services, coding and naming conventions differ, some research questions are service-specific (e.g. shipboard issues), and each service needs the autonomy to manage data in a manner that is consonant with the uniqueness and vagaries of its own data, its particular constellation of resources, its stage of development and its over-all data management perspective. Consequently, it was decided that databases should be separately maintained.

In addition, collaborative arrangements were initiated to facilitate database development. It was decided that the Navy would pass to the Air Force on IBM 3480 tapes, a five-year extract of data, with its native record and event structure intact, so the Air Force could evaluate the feasibility of constructing a relational model for these data. Such a model might also be used by the Air Force to construct their own longitudinal research database.

The Navy plans continue to expand the Champs research database. The Navy and the Air Force agreed that the Air Force, with Navy input, would pursue the development of its own relational database system which could serve as a prototype for the other services. ODBC (Open Database Connection) and SQL (Sequel Query Language) are the current standards of the software industry. SQL-based, ODBC-compliant database applications assure maximal flexibility in modifying data file structures and assuring compatibility with the proliferation of technologically advanced front ends that provide quick and easy data retrieval tools to extract, analyze, graphically display and report out data. Therefore, the Navy will work closely with the Air Force as they develop and test their ODBC-based SQL relational system, to not only aid the Air Force in that effort, but to also ensure interoperability of the respective systems.

Data element cross-mapping. To provide comparable data for joint research and reporting, and to aid the Air Force in patterning its "event" structures after the Navy model, it was decided that Air Force and Navy data elements must be cross-mapped. Data element definitions were exchanged and cross-mapping is well underway.

Data completeness. Data completeness issues were identified and it was agreed that the services would provide each other with hospitalization data. Participants agreed that hospitalizations have been historically under-reported by the respective services because data was not available on individuals treated at each other's service facilities. Sharing these data will provide more complete incidence reporting for all future cooperative research studies and represents a significant advance for defense department reporting of disease and injury across all

the services. A multi-service working group will be identified to define the process of capturing and exchanging this data.

3.3 Development of Prototype Epidemiologic Study.

Workshops focused on epidemiologic issues. The three workshops held at NHRC also focused on epidemiologic issues. Discussions of terms, measures and procedures led to a consensus on the standardization of key research methods required to produce data comparability for joint research reporting. Common terminology was defined for first hospitalizations, unconfirmed diagnoses, age and gender stratification, case counts, crude and age-adjusted incidence rates, and person-years. Agreement was reached on (1) methods to be used at this formative stage in the collaborative process, (2) to classify diseases in accordance with ICD-9 standard terminology, (3) to capture discharge diagnoses, (4) to count cases, (5) to calculate person-years and confidence intervals, and (5) to age adjust. A multi-service working group will be identified to continue the process of jointly defining the epidemiological and biostatistical conventions that will provide the basis of future collaborative research projects. These standardized methods were used to conduct the prototype epidemiology study and are presented in Table 7. These methods were used to conduct the prototype epidemiologic study, which is contained in Appendix B.

Table 7. Standardized Methods for Cooperative Multi-Service Research

Term/Procedure	Description	Standardized Measures
Age Adjustment	A procedure for adjusting rates, designed to minimize the effects of differences in age composition when comparing rates for different populations. (15)	Age adjustment is performed using the indirect method of standardization (see Standardization).
Age-Adjusted Incidence Rate	The result of age adjusting: A rate that controls for the age differences between populations.	A summary rate using indirect standardization to age adjust. These are the rates that would be expected if the Air Force, Army and Navy all had the same age distribution.
Age Groups	Stratification into several subgroups can be used to control for the effect of confounding variables such as age. Without such a mechanism, one can mistake the effect of differences in age composition for differences in disease rates, when in fact the age-specific rates are equivalent. (15)	Age groups are defined as follows: 17-19, 20-21, 22-24, 25-29, 30-34, 35-39, 40-44, and 45 and above. The 17-19, 20-21, and 22-24 year-old groups represent more finite categories than the older age categories groups. This was done because of the large number of young personnel in the military.
Case	Individuals identified as having the particular disease, health disorder, or condition under investigation. (15)	The number of first hospitalizations for all individuals observed during the study period, per diagnosis. For this study, services are reporting cases of their own personnel admitted to their own hospitals and not to other service hospitals. For future studies, each service will exchange hospitalization data for those persons admitted to their service-specific hospitals who belong to the other services.

Table 7. Standardized Methods for Cooperative Multi-Service Research (continued)

Term/Procedure	Description	Standardized Measures
Confidence Interval (95%)	Since the sample may not be representative of the larger population if the data were complete, or of a longer time period of observation, a statistical estimation is made to determine the range or interval of values that has a 95% probability of including the true incidence rate. The interval is bounded by an upper and lower confidence limit. (13, 15)	Confidence limits (intervals) around the incidence rates using the Poisson distribution for rare occurrences are employed. (Haenszel)
Crude Incidence Rate	A measure of the frequency with which a particular event occurs in a defined population. All rates are ratios, calculated by dividing a numerator, (e.g., the number of hospitalizations for kidney disease), by a denominator, (e.g., the total population at risk of contracting kidney disease for a specified time period). The population denominator can be expressed as the total number of people at risk or as person-time units (e.g., person-years) at risk. (13, 15)	The number of first hospitalizations per 100,000 person-years, without adjusting for age.
Denominator	The lower portion of a fraction, (e.g., the population at risk), used to calculate a rate. The denominator can be expressed as the average population at risk during a specified period, or as person-time units at risk for that period. (see person-years) (15)	The population at risk expressed in person-years.
Diagnosis	The identity of the condition from which a patient suffers. (15)	The International Classification of Diseases, 9th Revision (ICD-9) codes was used to classify diagnosis.

-32-

Table 7. Standardized Methods for Cooperative Multi-Service Research (continued)

Term/Procedure	Description	Standardized Measures
Diagnosis (continued)		The Army stores data on a maximum of 8 discharge diagnoses (primary, secondary, etc.), the Navy 10, and the Air Force 20. The Army searches 8 deep to identify diagnoses of interest, the Navy searches 10 deep, and the Air Force searches through only the first 10 of its 20 hierarchical discharge diagnoses.
First Hospitalization	The first inpatient admission within the specified interval for a unique ICD-9 diagnosis. Second and later hospitalizations for the same diagnosis are excluded in order to provide unduplicated counts.	For this study, only the first hospitalizations for the full 5-year interval were used. For future studies, subsequent hospitalizations may be included based on specific criteria (to be determined), as appropriate for certain diagnoses.
Numerator	The upper portion of a fraction used to calculate a rate. (15) The number of cases or occurrences of first hospitalizations. (18)	Occurrences of first hospitalizations or cases.
Person-Years at Risk	A more accurate way to calculate rates when the population is not constant and people enter or withdraw at different points during the period of observation. It is the sum of the individual years that persons in the study population have been at risk of contracting the condition of interest. Each person contributes only as many years as he/she is actually observed in the time interval of interest, i.e., 100 person-years may represent 100 persons for one year, 1 person for 100 years or any intermediate mixture between these extremes. (18)	This denominator combining persons and time is the sum of the number of days each person at risk contributed during the observation period, divided by 365.25.

Table 7. Standardized Methods for Cooperative Multi-Service Research (continued)

Term/Procedure	Description	Standardized Measures
Standardization	A set of techniques used to remove as far as possible the effects of differences in age, gender or other confounding factors, when comparing two or more populations. (15) For purposes of this study, "standardization" is synonymous with age-adjustment. Two methods of standardization can be used, direct or indirect. The most frequently adopted method is the indirect method. It is used to compare study populations when some age groups have small sample sizes producing specific rates that may be too imprecise and unreliable, i.e., statistically unstable, for use in detailed comparisons. (15, 17)	Since the population under study may be statistically unstable, indirect standardization as a method of age adjusting is used. Indirect standardization involves a series of mathematical steps as described by Lilienfeld. The specific rates in the standard population are averaged, using as weights the distribution of the study population. The ratio of the crude rate for the study population to the weighted average obtained is the standardized incidence ratio or SIR. The indirect standardized rate is the product of the SIR and the crude rate of the standard population (Note: a SIR is the incidence equivalent of a Standardized Mortality Ratio or SMR; see Lilienfeld for an explanation of SMR's). (Lilienfeld)
Standard Population	A commonly available population of known age distribution. (15)	For this report the sum of the person-years for Air Force, Army, and Navy enlisted women between 1990-1994 was used. For future studies, a total force standard population for an as yet to be determined time interval remains to be selected.

Prototype study results. This study confirmed the feasibility and utility of conducting cooperative multi-service research studies on women's health issues. It also resulted in the development of standardized methods for future medical research projects. The prototype study served to (1) identify research-related issues, (2) define common terminology and objectives, and (3) develop interim standardized methods for conducting joint research. These interim methods will serve as the basis for future development of long-term joint research standards.- The data produced are preliminary, incomplete in some cases, and are not suitable for drawing inferences. After the services have gained more collective experience refining these research standards and procedures, the focus can appropriately shift to the actual research outcomes, to statistical inferences and to the implications for policy, prevention and treatment of servicewomen.

The first phase of this research project focused on the acquisition and presentation of first hospitalization rates by disease in active duty women. First hospitalization rates can serve as indicators of disease incidence. The capability to obtain multi-service incidence rates allows comparative studies by gender, branch of service, and with national hospitalization rates. The relationship of disease and injury incidence to other military-relevant variables such as occupation, pay grade, and duty station assignment can be analyzed. Researchers can then begin to characterize the nature, extent, causal factors, and distribution of diseases common to active duty women and create interventions to prevent and control these diseases.

4.0 CONCLUSIONS

The goal of this multi-service project was to demonstrate the feasibility of a multi-service database architecture which would allow reporting of comparable illness and injury rates among the services. These goals identification and cross-mapping of relevant data elements, documentation and expansion of the Navy's existing database, and exploration of the feasibility of a system where separate service databases might be accessed via a common front end for study-specific integration of data in a seamless fashion.

The first phase of this project has focused on cross-service sharing of expertise and experience in medical research and in the database development required to support such research. Products from this cross-fertilization included (1) complete documentation of data sources and the development of a common data architecture, (2) the development of mechanisms to exchange hospitalization data for cross-service research and reporting (3) the development of mechanisms to exchange hospitalization data, (4) the development of standards for conducting research and presenting findings, and (5) a joint tri-service demonstration research study presenting Air Force, Army, and Navy incidence rates of first hospitalization for eight disease conditions pertinent to military women using comparable rate calculations, statistical adjustment and reporting format.

A 9-month collaboration of the Navy, Air Force and Army medical research community was undertaken, and has culminated in the development of a prototype epidemiology study that presents

comparable tri-service hospitalization rates for service women. The study is preliminary and will be expanded for the final report. To produce this report, the Navy, Air Force and Army medical research community conducted workshops to begin the process of identifying research issues, assigning work group tasks and defining common conventions and procedures to standardize data reporting. Workshop participants determined that each service would maintain a separate, geographically isolated data management systems. The common data structure, which has been defined, allows multi-service reporting of hospitalization data, and expanded epidemiological research, drawing on outpatient, tumor registry, HIV testing, stored serum sample data, and health survey results. To support the DWHRP, the Navy documented its existing system and expanded its enlisted Navy personnel database to include Navy officer and Marine Corps data. The Air Force has begun exploration of both a relational model suitable for storing research data and a front end which could be used to access multiple databases.

This cross-service collaboration was spawned by technological advances and by the recognition that health issues unique to an expanding population of women in the military must be addressed. Accomplishments in standardization, data exchange, documentation, and the acquisition of data from additional DoD sources will promote joint research endeavors and joint reporting of results. These multiple data sources now include Navy officer and Marine Corps data, and this compilation of data are now linked to produce integratable data files. The prototype epidemiological study included in this report represents the culmination of these efforts.

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APPENDICES

A. WORKSHOPS

B. PROTOTYPE STUDY

C. DATA REQUIREMENTS DOCUMENT

D. SYSTEM SPECIFICATIONS

E. EPISYS MANUAL

F. PROTOTYPE REPORT PLANS

G. CONGRESSIONAL ACTIONS

APPENDIX A

WORKSHOPS

TRI-SERVICE RELATIONAL DATABASE ARCHITECTURE WORKSHOP 1

December 13 & 14, 1994
San Diego, CA

Attendees:

Bruce Coate, Statistician
    Naval Health Research Center
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    Office for Prevention and Health Services Assessment,
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Edward D. Gorham, M.P.H., Research Epidemiologist
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E.K. Eric Gunderson, Ph.D., Senior Scientific Advisor
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Gus Gustafson, Computer Scientist
    Consultant – General Services Administration
Milan R. Miller, Computer Programmer/Analyst
    Department of Health Sciences and Epidemiology
    Naval Health Research Center
John W. Overland, Computer Programmer/Analyst
    Consultant – Ogden Government Services
Paul A. Pehau, Senior Programmer/Analyst
    Consultant – Ogden Government Services
William M. Pugh, Department Head, Medical Information Systems
    and Operations Research, Naval Health Research Center
Kathleen A. Scott, Project Leader
    Office for Prevention and Health Services Assessment,
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TRI-SERVICE RELATIONAL DATABASE ARCHITECTURE WORKSHOP 2

April 4, 1995
San Diego, CA

Attendees:

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Milan R. Miller, Computer Programmer/Analyst
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Kathleen A. Scott, Project Leader
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TRI-SERVICE RELATIONAL DATABASE ARCHITECTURE WORKSHOP 3

August 10 & 11, 1995
San Diego, CA

Attendees:
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APPENDIX B

PROTOTYPE STUDY

Abstract

Congress has mandated research on women's health in the Department of Defense. This study uses standardized methods to assess and compare disease incidence in active-duty enlisted Air Force, Army, and Navy women. Eight diagnostic categories that were considered to be relevant to military women were selected for investigation. Computerized records of the enlisted women on active duty in the three services during a five-year period from January 1, 1990 to December 31, 1994 were searched for hospital discharge diagnoses using the ICD-9-CM codes. This prototype study presents multi-service standardized epidemiologic methods and preliminary data.

Cooperative Prototype Tri-Service Age-Specific Study of Selected Disease Incidence in Military Women Using Inpatient Hospitalization Data

Congress has mandated a medical research program to focus on the specialized health needs of military women, including patterns of illness and injury, environmental and occupational hazards, and psychological stress, as well as the development of a database to facilitate long-term research studies (1). The number of women in the military is growing. Currently, women comprise approximately 14% of the total Armed Forces population in the United States. In upcoming years the percentage is projected to reach 20% (2). The expanding population of women in the military offers distinctive opportunities for long-term, gender-specific studies. It can also provide valuable data pertinent to both military and civilian women (1). Comprehensive incidence rates from such studies would be useful in planning preventive strategies, and in providing adequate and appropriately trained treatment personnel and facilities for women.

Epidemiologic studies in the military have historically been limited to a service-specific data source, and no previous study was identified that has used joint multi-service data to identify the incidence of hospitalizations. Furthermore, no multi-service study has been identified that has focused exclusively on women although several studies have examined gender differences in hospitalization patterns, but they have been confined to a specific service (3,4). In one study, pregnancy-related conditions, primarily the delivery of newborns, were determined to be the leading reason for hospital admissions (33.7%) in women (3). Also, there are conditions that can occur in both sexes which disproportionately affect women such as kidney disease (6), systemic lupus erythematosus (6,7), and genitourinary disorders (8).

The purpose of the present study was to provide standardized methods for calculating epidemiologic measures that could serve as a prototype for future multi-service women's health research. First hospitalization rates were used as a measure of disease incidence. Eight disease categories were selected for investigation. The diseases selected were either unique to or more common in women, possibly amenable to preventive intervention during military service, and of special interest to the women's health research community.

Methods

Computerized records of Air Force, Army, and Navy enlisted women on active duty at any time within a five-year period from January 1, 1990 to December 31, 1994 were searched for hospital discharge diagnoses. Each service used its own resources to retrieve the data and to acquire its respective population totals. The Air Force obtained numerator data from the Standard Inpatient Data Record maintained by the Air Force Medical Support Agency, and denominator data from the Uniform Airmen and Uniform Officer records maintained by the Armstrong Laboratory Human Resources Directorate. The Army used its existing surveillance

database, the Army Medical Surveillance System to obtain data. The Navy data was obtained from a career history data system containing comprehensive information on service history and hospitalizations for all Navy personnel (9, 14, 33-38). The name of the Navy system is the Career History Archival Medical and Personnel System (CHAMPS).

Population

Air Force, Army, and Navy enlisted women on active duty at any time during a five-year period from January 1, 1990 to December 31, 1994 were the population used in this study. Populations were stratified by age to determine age-specific rates. Age groups were defined as follows: 17-19, 20-21, 22-24, 25-29, 30-34, 35-39, 40-44, and 45 years and above

Numerator Data

First hospitalization for each of eight diagnoses was defined as the first inpatient admission between 1990 and 1994 for a unique International Classification of Diseases, 9th Revision (ICD-9) code (12). The eight selected diagnoses were: personality disorders (301.0-301.9); adjustment reactions and disorders (depressive) (309.0-309.1); adjustment reactions and disorders (other) (309.2-309.9); cholelithiasis (574.0-574.5); cholecystitis (575.0-575.1); kidney infections (590.0-590.9); pelvic inflammatory disease (614.0-614.9); and endometriosis (617.0-617.9). Second and later hospitalizations for the same diagnosis for the same person were excluded in order to provide unduplicated counts. Thus, one individual might have been hospitalized more than once for the same condition, but only her first admission for the condition during 1990-1994 was included.

Denominator Data

Two types of population data were obtained: the Army and Navy used the period of enlistment for each enlistee to calculate actual person-years and the Air Force used end-of-year annual strength totals to approximate person-years. The total number of person-years during this five year period for the Air Force was 280,001, for the Army, 308,797, and for the Navy, 217,873. The Navy and the Army calculated person-days incidence rates by dividing the total number of cases during the observation period by the time (in days) each person was observed, multiplied by 100,000 (13). The rates were converted to person-years expressed as the number of first hospitalizations per 100,000 person-years.

<u>Statistical Procedures</u>

Confidence intervals around the crude incidence rates were calculated using the Poisson distribution, for rarely occurring events (13). A table of 95 percent confidence intervals was used to calculate the 95 percent confidence limits for low incidence rates exemplified in this study (13). Because these are based on rarely occurring events, the interval was wider than that of a normally distributed confidence interval, reflecting the uncertainties based on estimates involving a small number of cases (13).

Nearly all comparisons of rates among populations require statistical adjustment for age or other factors known to influence the distribution of the disease under study. Appropriate methods for assessing the statistical significance of observed differences must also be used (14). In this study, age-specific rates were used to calculate age-adjusted service-specific total incidence rates. Adjustment is performed on rates because of differing age distributions in populations that are being compared (15,16). The procedure used in this study to adjust the rates for age differences in the three services was indirect standardization, because some age strata comprised small numbers of women, and the associated specific rates were too imprecise for use in detailed comparisons among the three services (17).

Results

Age-adjusted incidence rates varied among the three services depending on the diagnosis. The rates ranged from a high of 1141.3 per 100,000 person-years for pelvic inflammatory disease (Army) to a low of 27.2 for cholecystitis (Air Force). Age-specific incidence rates for women in all services (Air Force, Army, and Navy) are shown in Tables 2-9. These tables are preliminary and represent data that may be incomplete and remain to be verified.

<u>Psychological Disorders:</u>

Adjustment Disorders, depressive (ICD-9 codes 309.0-309.1) and other (ICD-9 codes 309.2-309.9); Personality Disorders (ICD-9 codes 301.0-301.9)

Adjustment disorders are defined in the DSM-IV (18) as "the development of clinically significant emotional or behavioral symptoms in response to an identifiable psychosocial stressor or stressors". A common adjustment disorder is depression, which is manifest by symptoms such as depressed mood, tearfulness or feeling of hopelessness. Other adjustment disorders include anxiety, disturbance of conduct (e.g., truancy, vandalism, reckless driving, fighting, defaulting on legal responsibilities) and maladaptive reactions (e.g., physical complaints, social withdrawal, or work or academic inhibition). Adjustment disorders can be acute (less than 6 month duration) or chronic (6 months or longer).

Personality disorders are defined in the DSM-IV (18) as "an enduring pattern of inner experience and behavior that deviates markedly from the expectations of the individual's culture, is pervasive and inflexible, has an onset in adolescence or early adulthood, is stable over time, and leads to distress or impairment".

Crude and age-adjusted first hospitalization rates for adjustment and personality disorders among Air Force, Army and Navy personnel are summarized in Tables 2-4 for the years 1990 through 1994. Adjustment disorders are divided into depressive disorders (ICD-9 codes 309.0-309.1) and other disorders (ICD-9 codes 309.2-309.9). Personality disorders were identified using ICD-9 code 301.

The first hospitalization incidence rates for adjustment disorders (depressive) are shown in Table 2. The total rates ranged from a low of 195.0 per 100,000 person-years (95% CI, 178.4-213.1) in the Air Force to a high of 416.4 in the Army (95% CI, 391.0-443.1). Air Force and Navy rates were lower than Army rates for all age groups. Air Force and Army rates decreased steadily until age 35-39 years, when the rates increased. Except for a slight rise at ages 30-34 years, Navy rates also decreased steadily through age 61 years.

First hospitalization incidence rates for adjustment disorders (other) are shown in Table 3. The total rates ranged from a low of 304.9 per 100,000 person-years (95% CI, 283.0-328.7) in the Navy to a high of 569.3 in the Army (95% CI, 534.6-605.7). The highest crude rate was noted in Army women ages 17-19 years who had a rate of 1546.5 per 100,000 person years. All three services' rates decreased steadily until age 40-44 where the rates for all services increased, but then decreased again in the 45-61 year old group.

First hospitalization incidence rates for personality disorders are shown in Table 4. The total rates ranged from a low of 225.3 per 100,000 person-years (95% CI, 207.7-244.2) in the Air Force to a high of 781.6 (95% CI, 733.9-831.6) in the Navy. The age group at highest risk was the 17 to 19-year-old group for all three services. Similar to adjustment disorders, the incidence of hospitalization for personality disorders also declined with age.

Kidney infections (Pyelonephritis)

Many women experience recurrent infections. Brauner et al (30) in a 38-month prospective study of 23 women with acute pyelonephritis due to E. coli, reported that despite treatment and repeated negative urine cultures, each woman had 1-4 new episodes of E. coli bacteria caused by E. coli strains identical to the one that caused the initial episode. Stamm et al (31) observed 51 infection prone women for eight years and reported that when these women were not receiving antimicrobial prophylaxis, infections occurred at an average rate of 2.6 per patient year, but varied widely from patient to patient. These results suggest that the infecting E. coli strain may survive in fecal flora or is harbored in patients' surroundings (30).

There have been few studies comparing the rates of pyelonephritis and other urinary tract infections among men and women. Recent statistics for inpatients discharged from short

stay, nonfederal hospitals in 1991 with the ICD-9 code 590 indicate a female to male ratio of 4.1:1 (32).

First hospitalization incidence rates for kidney infections in the present study are shown in Table 5. The total rates ranged from a low of 197.3 per 100,000 person-years (95% CI, 179.7-216.6) in the Navy to a high of 354.0 in the Army (95% CI, 332.4-376.7). Within the Army, kidney infection rates decreased steadily with age, except in the 45-61 year old group, where the rate again rose. Kidney infection rates among Navy women showed no consistent linear pattern, but were generally lower among older age groups. Air Force kidney infection rates generally decreased with age, but rose again in older age groups. A high incidence of pyelonephritis and urinary tract infections could lead to increased heath care costs and time lost from work. Further research is needed to examine differences among women by branch of military service, by deployment status, and by paygrade.

Incidence rates of five other diagnoses were investigated in this study. The rates for cholelithiasis are shown in Table 6. They were similar among the three services for all age groups, and generally increased with age. Rates for cholecystitis are shown in Table 7. They appear comparable among the three services until ages 35-39 when Navy incidence rates increase. Rates for endometriosis are shown in Table 8. Rates increased with age, confirming that women in older age groups were at higher risk . Finally, rates for pelvic inflammatory disease (PID) are shown in Table 9. The age-adjusted rates for PID are the highest of any diagnosis observed across all three services. In the Navy, crude rates increased steadily, peaking at 1738.8 per 100,000 person-years in the 40-44 year-old age group, but declined to 481.4 in the 45-61 year old group. Generally, the same pattern was seen in the Air Force and Army, with higher rates in the 25-44 year-old age groups.

Discussion

This study was undertaken to demonstrate the feasibility of conducting cooperative multi-service research into women's health and to develop standard methods for future medical research projects. The primary intent was to identify research-related issues, to define common terminology and objectives, and to develop standardized methods for conducting joint research. The data produced in carrying out this demonstration are preliminary and incomplete in some cases. Therefore, these data should not be used to draw inferences. After the services have gained more collective experience refining these research standards and procedures, the focus can shift to the actual research outcomes, to epidemiological inferences, and to the implications for policy, prevention, and treatment of servicewomen.

Eight diagnoses were examined in this exploratory investigation of first hospitalization rates among Air Force, Army, and Navy enlisted women. The results have provided preliminary data on differences in hospitalization rates among women of different ages and between the services, and a profile of age groups that appear to be at increased risk for these

diseases. Statistical testing to compare age-specific and service-specific risk was not an objective of this study, but could be undertaken in the future.

Several limitations of these results, either due to study design or to artifact, must be addressed when interpreting the results. Artifactual limitations are mechanical or procedural in nature and can result from between service differences in whether, how and when cases are counted. These service differentials encompass: (1) obtaining data, i.e., the amount of missing or incomplete data, (2) how cases are counted, (3) whether women with particular conditions are hospitalized or treated in outpatient or rehabilitation centers, (4) certain conditions which may be differentially associated with military discharge before a first hospitalization occurs, and (5) newly developed standardized methods and data management processes that require optimization. Artifactual limitations could include, for example, differences in criteria and how they were employed to determine who should be hospitalized, differences in how medical records are kept, differential delays in obtaining hospital data and person-year (length of service) data, and different procedures between the three services in terms of what criteria were used to determine who should be hospitalized.

First hospitalizations may not provide a complete picture of incidence rates for some of the diagnoses studied, since only inpatient admissions were included in this study. Outpatient visits and cases that never came to the attention of the health care system were not included. Incidence rates of first hospitalizations therefore represent only the most severe cases, the "tip of the iceberg." True incidence rates of these diseases may, therefore, be under-reported. Furthermore, the degree of under-reporting probably is not uniform for all eight diseases investigated, because some conditions such as cholecystitis are very likely to result in hospitalization (6), while psychological conditions for example, in general are treated in ambulatory facilities. In some cases, data were not available for the latter part of 1994. Finally, there may be service-specific factors such as serving aboard ship or flying an aircraft that differentially affect who gets hospitalized.

There are also epidemiological study design limitations to this study. Study design limitations include issues of stratification and adjustment for other factors to control for confounding, and the possibility of differences among the services in the utilization of hospital treatment by military women. Also, the hospitalization data were not stratified by or adjusted for such potentially important confounders as race, occupation (different occupations pose different risks for varying diagnoses), or markers of socioeconomic status (SES). Important differences in the racial, occupational or SES composition of the three services may account for some of the rate differences presented. Future studies can be designed to address these limitations.

Despite the limitations, incidence rates based on first hospitalization events can characterize the most severe spectrum of illnesses and injuries affecting a population. Many previous studies have used incidence rates based on first hospitalizations (3, 9, 33-38). The ability of the Department of Defense to identify and characterize the most serious medical problems facing active-duty servicewomen will be enhanced by collaborative epidemiologic

research exemplified by this study. The results of future studies modeled after this study have several implications for Air Force, Army, and Navy health care providers. For example, they may help drive preventive medicine efforts throughout the military. Also, these rates can provide the basis for efficient planning and allocation of medical personnel and resources to assist in maintaining military readiness. Finally, results of future research may be generalizable to all women and significantly improve women's health, medical care and quality of life.

Table 2. Incidence rates of first hospitalizations for adjustment reactions and disorders (depressive) (ICD-9 309.0-309.1) in active-duty enlisted Air Force, Army and Navy women per 100,000 person-years, 1990-1994 *

Age in years	Air Force enlisted					Army enlisted					Navy enlisted				
	No. of cases †‡	No. of person-years at risk §	Rate	95 Percent confidence interval # Lower	Upper	No. of cases †	No. of person-years at risk	Rate	95 Percent confidence interval # Lower	Upper	No. of cases †	No. of person-years at risk	Rate	95 Percent confidence interval # Lower	Upper
17-19	116	22496	515.7	428.0	620.8	236	26964	875.2	759.7	1007.4	117	24495	477.7	391.1	564.0
20-21	100	41171	242.9	198.7	296.3	280	52044	538.0	474.5	610.1	110	42167	260.9	212.1	309.5
22-24	118	56764	207.9	172.9	249.9	261	65802	396.6	349.8	449.7	83	53648	154.7	121.4	187.9
25-29	107	67750	157.9	130.0	191.6	268	74195	361.2	318.6	409.6	80	53679	149.0	116.4	181.6
30-34	40	47644	84.0	59.9	114.2	120	51040	235.1	195.8	282.1	46	27818	165.4	117.6	213.0
35-39	32	32769	97.7	66.8	138.1	77	27890	276.1	216.7	350.6	19	11958	158.9	87.6	229.8
40-44	11	10322	106.6	53.2	190.8	24	8439	284.4	182.3	423.8	4	3278	122.0	4.6	238.8
45-61	1	1085	92.2	2.3	513.4	9	2423	371.5	170.1	705.9	1	831	120.4	0.0	240.7
Total	525	280001	187.5	171.9	204.5	1275	308797	412.9	387.7	439.3	460	217873	211.1	191.8	230.4
Age-adjusted rate **			195.0	178.4	213.1			416.4	391.0	443.0			199.0	181.3	218.5

* 1994 data incomplete due to delays in data acquisition.
† Services are reporting cases of their own personnel admitted to their own hospitals (MTF's).
‡ Three percent of diagnoses are unconfirmed.
§ Air Force approximated person-years at risk by summing mean annual strength for the five years, 1990-1994.
# Service-specific variations of the Haenszel et al approach to calculating confidence intervals for rarely occurring events using the Poisson distribution.
** Age adjustment was performed using the indirect standardization method. For this study, the entire female military population was used as a standardized population.

PRELIMINARY FINDINGS

Table 3. Incidence rates of first hospitalizations for adjustment reactions and disorders (other) (ICD-9 309.2-309.9) in active-duty enlisted Air Force, Army and Navy women per 100,000 person-years, 1990-1994 *

	Air Force enlisted						Army enlisted						Navy enlisted				
Age in years	No. of cases †‡	No. of person-years at risk §	Rate	95 Percent confidence interval # Lower	Upper		No. of cases †	No. of person-years at risk	Rate	95 Percent confidence interval # Lower	Upper		No. of cases †	No. of person-years at risk	Rate	95 Percent confidence interval # Lower	Upper
17-19	270	22496	1200.2	1063.4	1354.8		417	26964	1546.5	1401.1	1707.3		164	24495	669.5	567.0	771.8
20-21	190	41171	461.5	399.2	533.3		422	52044	810.9	734.7	895.2		189	42167	448.2	384.3	512.0
22-24	156	56764	274.8	234.2	322.5		333	65802	506.1	451.4	567.3		138	53648	257.2	214.3	300.1
25-29	154	67750	227.3	193.4	267.1		289	74195	389.5	343.5	441.7		131	53679	244.0	202.2	285.8
30-34	67	47644	140.6	109.8	179.9		164	51040	321.3	274.4	376.2		68	27818	244.5	186.3	302.4
35-39	35	32769	106.8	74.5	148.5		79	27890	283.3	222.4	359.8		21	11958	175.6	100.6	250.2
40-44	19	10322	184.1	110.8	287.2		30	8439	355.5	240.0	508.4		7	3278	213.5	56.7	369.4
45-61	0	1085	0.0	0.0	0.0		3	2423	123.8	25.5	361.5		0	831	0.0	0.0	0.0
Total	891	280001	318.2	297.7	340.0		1737	308797	562.5	528.2	598.5		718	217873	329.6	305.4	353.6
Age-adjusted rate **			334.8	312.0	358.9				569.3	534.6	605.7				304.9	282.9	328.7

* 1994 data incomplete due to delays in data acquisition.
† Services are reporting cases of their own personnel admitted to their own hospitals (MTF's).
‡ Three percent of diagnoses are unconfirmed.
§ Air Force approximated person-years at risk by summing mean annual strength for the five years, 1990-1994.
# Service-specific variations of the Haenszel et al approach to calculating confidence intervals for rarely occurring events using the Poisson distribution.
** Age adjustment was performed using the indirect standardization method. For this study, the entire female military population was used as a standardized population.

PRELIMINARY FINDINGS

Table 4. Incidence rates of first hospitalizations for personality disorders (ICD-9 301.0-301.9) in active-duty enlisted Air Force, Army and Navy women per 100,000 person-years, 1990-1994 *

| Age in years | Air Force enlisted | | | | | Army enlisted | | | | | Navy enlisted | | | | |
| | No. of cases †‡ | No. of person-years at risk § | Rate | 95 Percent confidence interval # | | No. of cases † | No. of person-years at risk | Rate | 95 Percent confidence interval # | | No. of cases † | No. of person-years at risk | Rate | 95 Percent confidence interval # | |
				Lower	Upper				Lower	Upper				Lower	Upper
17-19	84	22496	373.4	299.6	465.3	407	26964	1509.4	1367.5	1666.4	542	24495	2212.7	2026.4	2398.9
20-21	123	41171	298.8	249.4	357.8	388	52044	745.5	670.2	829.0	503	42167	1192.9	1088.6	1297.1
22-24	131	56764	230.8	193.6	274.9	289	65802	439.2	387.4	498.1	341	53648	635.6	568.1	703.0
25-29	118	67750	174.2	144.8	209.4	294	74195	396.3	349.5	449.4	256	53679	476.9	418.5	535.3
30-34	74	47644	155.3	122.7	196.0	182	51040	356.6	307.4	413.7	119	27818	427.8	350.9	504.5
35-39	49	32769	149.5	110.6	198.0	77	27890	276.1	216.7	350.6	62	11958	518.5	389.4	647.2
40-44	18	10322	174.4	103.4	275.5	37	8439	438.5	305.6	609.5	12	3278	366.1	159.7	571.1
45-61	3	1085	276.5	57.0	807.4	10	2423	412.7	198.1	759.4	0	831	0.0	0.0	0.0
Total	600	280001	214.3	197.6	232.3	1684	308797	545.3	512.0	580.2	1835	217873	842.2	803.7	880.8
Age-adjusted rate **			225.3	207.7	244.2			551.1	517.5	586.4			781.6	733.9	831.6

* 1994 data incomplete due to delays in data acquisition.
† Services are reporting cases of their own personnel admitted to their own hospitals (MTF's).
‡ Three percent of diagnoses are unconfirmed.
§ Air Force approximated person-years at risk by summing mean annual strength for the five years, 1990-1994.
# Service-specific variations of the Haenszel et al approach to calculating confidence intervals for rarely occurring events using the Poisson distribution.
** Age adjustment was performed using the indirect standardization method. For this study, the entire female military population was used as a standardized population.

Table 5. Incidence rates of first hospitalizations for kidney infections (ICD-9 590.0-590.9) in active-duty enlisted Air Force, Army and Navy women per 100,000 person-years, 1990-1994 *

Age in years	Air Force enlisted						Army enlisted						Navy enlisted					
	No. of cases †‡	No. of person-years at risk §	Rate	95 Percent confidence interval # Lower	Upper		No. of cases †	No. of person-years at risk	Rate	95 Percent confidence interval # Lower	Upper		No. of cases †	No. of person-years at risk	Rate	95 Percent confidence interval # Lower	Upper
17-19	132	22496	586.8	492.7	698.5		164	26964	608.2	519.4	712.2		57	24495	232.7	172.3	292.9
20-21	169	41171	410.5	352.0	478.6		286	52044	549.5	484.7	623.1		122	42167	289.3	238.0	340.6
22-24	158	56764	278.4	237.4	326.3		263	65802	399.7	352.5	453.3		130	53648	242.3	200.6	283.9
25-29	140	67750	206.6	174.4	244.7		210	74195	283.0	245.6	325.7		83	53679	154.6	121.3	187.8
30-34	60	47644	125.9	97.0	163.7		105	51040	205.7	168.3	251.0		44	27818	158.2	111.4	204.7
35-39	30	32769	91.6	61.8	130.9		43	27890	154.2	110.1	209.7		17	11958	142.2	74.7	209.2
40-44	11	10322	106.6	53.2	190.8		10	8439	118.5	56.9	218.0		6	3278	183.0	38.1	327.0
45-61	2	1085	184.3	22.3	665.4		4	2423	165.1	44.9	422.7		1	831	120.4	0.0	240.7
Total	702	280001	250.7	232.7	270.2		1085	308797	351.4	330.0	373.9		460	217873	211.1	191.8	230.4
Age-adjusted rate **			262.8	243.9	283.3				354.0	332.4	376.7				197.3	179.7	216.6

* 1994 data incomplete due to delays in data acquisition.

† Services are reporting cases of their own personnel admitted to their own hospitals (MTF's).

‡ Three percent of diagnoses are unconfirmed.

§ Air Force approximated person-years at risk by summing mean annual strength for the five years, 1990-1994.

Service-specific variations of the Haenszel et al approach to calculating confidence intervals for rarely occurring events using the Poisson distribution.

** Age adjustment was performed using the indirect standardization method. For this study, the entire female military population was used as a standardized population.

Table 6. Incidence rates of first hospitalizations for cholelithiasis (ICD-9 574.0-574.5) in active-duty enlisted Air Force, Army and Navy women per 100,000 person-years, 1990-1994 *

Age in years	Air Force enlisted					Army enlisted					Navy enlisted				
	No. of cases †‡	No. of person-years at risk §	Rate	95 Percent confidence interval #		No. of cases †	No. of person-years at risk	Rate	95 Percent confidence interval #		No. of cases †	No. of person-years at risk	Rate	95 Percent confidence interval #	
				Lower	Upper				Lower	Upper				Lower	Upper
17-19	7	22496	31.1	12.5	64.1	12	26964	44.5	23.0	77.9	12	24495	49.0	21.4	76.4
20-21	64	41171	155.5	120.6	200.2	55	52044	105.7	78.4	139.5	60	42167	142.3	106.3	178.2
22-24	71	56764	125.1	98.4	158.6	95	65802	144.4	116.8	179.1	106	53648	197.6	160.0	235.1
25-29	123	67750	181.6	151.5	217.4	108	74195	145.6	119.1	177.6	83	53679	154.6	121.3	187.8
30-34	85	47644	178.4	143.4	222.1	72	51040	141.1	110.8	179.2	80	27818	287.6	224.5	350.5
35-39	54	32769	164.8	124.1	216.2	54	27890	193.6	143.7	255.6	38	11958	317.8	216.8	418.4
40-44	22	10322	213.1	133.6	321.8	22	8439	260.7	163.5	393.7	10	3278	305.1	117.0	492.0
45-61	3	1085	276.5	57.0	807.4	9	2423	371.5	170.1	705.9	6	831	722.1	150.5	1290.0
Total	429	280001	153.2	139.3	168.6	427	308797	138.3	125.3	152.7	395	217873	181.3	163.4	199.2
Age-adjusted rate **			149.4	135.4	164.9			137.0	124.1	151.2			189.9	170.7	211.2

* 1994 data incomplete due to delays in data acquisition.
† Services are reporting cases of their own personnel admitted to their own hospitals (MTF's).
‡ Three percent of diagnoses are unconfirmed.
§ Air Force approximated person-years at risk by summing mean annual strength for the five years, 1990-1994.
# Service-specific variations of the Haenszel et al approach to calculating confidence intervals for rarely occurring events using the Poisson distribution.
** Age adjustment was performed using the indirect standardization method. For this study, the entire female military population was used as a standardized population.

Table 7. Incidence rates of first hospitalizations for cholecystitis (ICD-9 575.0-575.1) in active-duty enlisted Air Force, Army and Navy women per 100,000 person-years, 1990-1994 *

Age in years	Air Force enlisted					Army enlisted					Navy enlisted				
	No. of cases †‡	No. of person-years at risk §	Rate	95 Percent confidence interval # Lower	Upper	No. of cases †	No. of person-years at risk	Rate	95 Percent confidence interval # Lower	Upper	No. of cases †	No. of person-years at risk	Rate	95 Percent confidence interval # Lower	Upper
17-19	1	22496	4.5	0.1	24.8	6	26964	22.3	8.2	48.6	5	24495	20.4	2.8	38.0
20-21	13	41171	31.6	16.8	54.0	11	52044	21.1	10.5	37.8	11	42167	26.1	10.7	41.3
22-24	14	56764	24.7	13.5	41.4	17	65802	25.8	15.0	41.3	14	53648	26.1	12.5	39.6
25-29	13	67750	19.2	10.2	32.8	33	74195	44.5	30.0	63.6	13	53679	24.2	11.1	37.3
30-34	20	47644	42.0	25.7	64.7	14	51040	27.4	15.0	46.0	5	27818	18.0	2.4	33.4
35-39	10	32769	30.5	14.7	56.2	6	27890	21.5	7.9	46.9	13	11958	108.7	49.8	167.3
40-44	5	10322	48.4	15.7	112.9	2	8439	23.7	2.9	85.6	4	3278	122.0	4.6	238.8
45-61	2	1085	184.3	22.3	665.4	1	2423	41.3	1.0	230.0	0	831	0.0	0.0	0.0
Total	78	280001	27.9	22.2	34.9	90	308797	29.2	23.6	36.2	65	217873	29.8	22.6	37.1
Age-adjusted rate **			27.2	21.4	34.5			29.0	23.5	36.0			31.1	23.9	40.4

* 1994 data incomplete due to delays in data acquisition.
† Services are reporting cases of their own personnel admitted to their own hospitals (MTF's).
‡ Three percent of diagnoses are unconfirmed.
§ Air Force approximated person-years at risk by summing mean annual strength for the five years, 1990-1994.
# Service-specific variations of the Haenszel et al approach to calculating confidence intervals for rarely occurring events using the Poisson distribution.
** Age adjustment was performed using the indirect standardization method. For this study, the entire female military population was used as a standardized population.

Table 8. Incidence rates of first hospitalizations for endometriosis (ICD-9 617.0-617.9) in active-duty enlisted Air Force, Army and Navy women per 100,000 person-years, 1990-1994 *

Age in years	Air Force enlisted					Army enlisted					Navy enlisted				
	No. of cases †‡	No. of person-years at risk §	Rate	95 Percent confidence interval # Lower	Upper	No. of cases †	No. of person-years at risk	Rate	95 Percent confidence interval # Lower	Upper	No. of cases †	No. of person-years at risk	Rate	95 Percent confidence interval # Lower	Upper
17-19	28	22496	124.5	82.8	180.5	43	26964	159.5	113.9	216.9	25	24495	102.1	62.1	141.8
20-21	70	41171	170.0	133.5	215.9	123	52044	236.3	196.8	283.6	72	42167	170.8	131.3	210.1
22-24	145	56764	255.4	216.2	301.6	182	65802	276.6	238.4	320.9	102	53648	190.1	153.2	227.0
25-29	247	67750	364.6	321.3	413.8	319	74195	430.0	383.6	482.0	191	53679	355.8	305.3	406.2
30-34	214	47644	449.2	391.6	514.9	262	51040	513.3	452.7	582.1	187	27818	672.2	575.8	768.4
35-39	183	32769	558.5	481.9	647.1	184	27890	659.8	568.7	765.4	150	11958	1254.4	1053.5	1454.8
40-44	56	10322	542.5	411.7	709.6	62	8439	734.7	565.7	955.1	46	3278	1403.3	997.7	1807.3
45-61	9	1085	829.5	379.9	1576.0	15	2423	619.1	346.7	1021.5	6	831	722.1	150.5	1290.0
Total	952	280001	340.0	318.8	362.4	1190	308797	385.4	361.9	410.1	779	217873	357.6	332.4	382.6
Age-adjusted rate **			319.9	299.4	341.7			381.4	358.1	405.8			395.2	366.7	426.0

* 1994 data incomplete due to delays in data acquisition.
† Services are reporting cases of their own personnel admitted to their own hospitals (MTF's).
‡ Three percent of diagnoses are unconfirmed.
§ Air Force approximated person-years at risk by summing mean annual strength for the five years, 1990-1994.
# Service-specific variations of the Haenszel et al approach to calculating confidence intervals for rarely occurring events using the Poisson distribution.
** Age adjustment was performed using the indirect standardization method. For this study, the entire female military population was used as a standardized population.

Table 9. Incidence rates of first hospitalizations for pelvic inflammatory disease (ICD-9 614.0-614.9) in active-duty enlisted Air Force, Army and Navy women per 100,000 person-years, 1990-1994 *

Age in years	Air Force enlisted					Army enlisted					Navy enlisted				
	No. of cases †‡	No. of person-years at risk §	Rate	95 Percent confidence interval # Lower	Upper	No. of cases †	No. of person-years at risk	Rate	95 Percent confidence interval # Lower	Upper	No. of cases †	No. of person-years at risk	Rate	95 Percent confidence interval # Lower	Upper
17-19	123	22496	546.8	456.4	654.8	316	26964	1171.9	1045.3	1313.7	97	24495	396.0	317.2	474.6
20-21	200	41171	485.8	421.7	559.1	476	52044	914.6	833.2	1004.2	219	42167	519.4	450.6	588.1
22-24	258	56764	454.5	401.6	514.5	598	65802	908.8	831.6	993.3	289	53648	538.7	476.6	600.7
25-29	497	67750	733.6	671.1	802.0	922	74195	1242.7	1163.2	1327.2	423	53679	788.0	712.9	863.1
30-34	395	47644	829.1	750.6	916.0	716	51040	1402.8	1301.8	1512.2	317	27818	1139.6	1014.0	1264.9
35-39	262	32769	799.5	707.1	904.2	390	27890	1398.4	1257.2	1555.0	172	11958	1438.4	1223.3	1653.0
40-44	67	10322	649.1	506.6	830.2	101	8439	1196.9	979.1	1460.2	57	3278	1738.8	1287.3	2188.8
45-61	7	1085	645.2	258.7	1329.0	19	2423	784.2	472.1	1223.4	4	831	481.4	18.2	942.1
Total	1809	280001	646.1	606.7	687.5	3538	308797	1145.7	1075.8	1219.0	1578	217873	724.3	688.5	760.0
Age-adjusted rate **			630.1	591.7	670.4			1141.3	1071.7	1214.3			752.9	707.0	801.1

* 1994 data incomplete due to delays in data acquisition.
† Services are reporting cases of their own personnel admitted to their own hospitals (MTF's).
‡ Three percent of diagnoses are unconfirmed.
§ Air Force approximated person-years at risk by summing mean annual strength for the five years, 1990-1994.
# Service-specific variations of the Haenszel et al approach to calculating confidence intervals for rarely occurring events using the Poisson distribution.
** Age adjustment was performed using the indirect standardization method. For this study, the entire female military population was used as a standardized population.

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APPENDIX C

DATA REQUIREMENTS DOCUMENT

DATA REQUIREMENTS DOCUMENT

for the

CHAMPION

(Career History Analytical

Medical and Physical

Information Open Network)

RESEARCH DATABASE

TABLE OF CONTENTS

APPENDICES

SECTION 1

GENERAL

1.1 PURPOSE OF THE DATA REQUIREMENTS DOCUMENT

This Data Requirements Document (DRD) for the Career History Analytical Medical and Physical Open Network (CHAMPION) System is written to fulfill the following objectives:

- To provide a detailed definition of the data requirements for CHAMPION and the sources of the data,

- To communicate details of the on-going analysis between the user's operational personnel and the appropriate development personnel.

1.2 ENVIRONMENT

CHAMPION is a computerized medical and personnel database that provides extensive information for Naval medical management for occupational health and epidemiologic research. The database is being expanded to include Navy officers and Marine Corps officer and enlisted personnel. The system has been developed by the Naval Health Research Center (NHRC), San Diego, CA, in association with the Air Force and Army. The mission of the Naval Health Research Center, as assigned by the Secretary of the Navy, and two of the functions to be performed to accomplish the mission, as assigned by the Commander, Naval Medical Command (NHRCINST 5450.1E), are:

To support fleet operational readiness through research, development, testing, and evaluation on the biomedical and psychological aspects of Navy and Marine Corps

personnel health and performance, and to perform such other functions or tasks as may be directed by higher authority.

As directed by the Commanding Officer, Naval Medical Research and Development Command, Bethesda, Maryland:

a.   Conduct occupational health and safety studies of the Naval service to: identify environmental hazards in the workplace and aboard ship; assess the impact of potentially harmful agents or conditions on health and performance; determine causal factors in illness and accidents; and to develop cost-effective intervention strategies.

b.   Maintain data files of medical and service history information for all Naval personnel to: serve as the basis for longitudinal health studies on morbidity, disability, and mortality in relation to demographic, occupational, environmental, psychological, and service history variables; identify health and safety risks to Naval personnel; and to assess the impact of chronic disease on performance and retention.

1.3   REFERENCES

a.   Documentation for CHAMPION will be in accordance with:

(1) Life Cycle Management of Automated Information Systems, DoD Directive 7920.1, 17 October 1978;

(2) DoD Automated Information Systems Documentation Standards Manual, DoD STD 7935A, 31 October 1988; and

        (3) DoD Automated Information System Life Cycle Management Manual, DoD Manual 7920.2M, 1 March 1990.

        (4) *Guidelines* For Documentation of Computer Programs and Automated Data Systems.

   b. The following documents were used as references for this DRD:

        (1) A Guide to the Computerized Medical Data Resources of the Naval Health Research Center, Report Number 87-13.

1.4   APPENDICES

Appendix A lists acronyms and abbreviations.

Appendix B lists file and record layouts.

Appendix C lists data elements.

Appendix D lists static data elements.

SECTION 2

DATA DESCRIPTION

2.1 STATIC DATA

Static data consists of validation and conversion tables used by the programs to validate input data and convert coded data to descriptions. Each validation/conversion table is described in detail in the following paragraphs. The static data used by CHAMPION is shown in Appendix D.

2.1.1 Accounting Category Code

The Accounting Category Code is a two position numeric field which reflects the reason a member is attached to an activity (UIC). Valid values for Accounting Category Code are listed in Appendix D.

2.1.2 Attrition Indicator

The Attrition Indicator validation table is used to validate the attrition codes in the update transactions. Appendix D lists valid codes for Attrition Indicator.

2.1.3 Branch Class From

Branch and Class From is a two position numeric field which indicates the branch and component of service in which a member was last discharged from or served with. Valid values for Branch and Class from are listed in Appendix D.

2.1.4 Designator Code

Designator Code is a four position numeric field which indicates the occupational job in which a Naval officer is currently serving. The first 3 characters

define the officer's type of duty, the last character defines the status of the officer. Valid Designator Codes are listed in Appendix D.

2.1.5 DoD Death Loss Code

DoD Death Loss Code is a three position numeric field that indicates the members DoD Death Loss Code. This code reflects the cause of death during active duty. Valid values for DoD Death Loss Code are listed in Appendix D.

2.1.6 DoD Loss Code

The DoD Loss Code validation table is used to validate the DoD Loss Codes coded in the update transactions. Appendix D lists valid codes for DoD Loss Codes.

2.1.7 Event Code

The Event Code table lists the event codes and associated descriptions. Events within the CHAMPION database are used to indicate specific events during the careers of military members. The values for Event Code are listed in Appendix D.

2.1.8 Home Port

Home Port is a two position numeric field which identifies the home port of the vessel the member is currently assigned to. This table is used to validate home port data in the input data files. Valid values for Home Port are listed in Appendix D.

2.1.9 NEC

Navy Enlisted Classification (NEC) is a four position alphanumeric field which indicates a primary special knowledge or skill for manpower management usage. Data from all NEC manuals available from 1965 to 1985 have been entered into the computer. Valid values for NEC are listed in Appendix D.

2.1.10 NUC AEF Ind

A two position alphanumeric field which indicates one of Nuclear Field Program Loss Indicator or Advanced Electronics Field Indicator (AEF). If the element is numeric, it will contain the nuclear field program loss indicator. If the first position contains an 'E', this element will contain the advanced electronics field indicator (AEF) data. This table is used to validate the NUC AEF Indicator field in input records. Valid values for this field are listed in Appendix D.

2.1.11 Onboard Activity Code

Onboard Activity Code is a ten position numeric field which identifies the activity to which a member is currently attached; the following is a breakdown of this code. Valid values for Onboard Activity Code are listed in Appendix D.

2.1.12 Original DoD Loss Code

Original DoD Loss Code is a three position alphanumeric field indicating the members original DOD loss (Navy enlisted) code. Valid values for this field are listed in Appendix D.

2.1.13 Projected Rate Code

The Projected Rate Code validation table is used to validate the occupation rate in which an enlistment/reenlistment is being made in the update transactions. Appendix D lists valid codes for Projected Rate Code.

2.1.14 Rate Code

The Rate Code validation table is used to validate the rate codes in the update transactions. Appendix D lists valid codes for Rate Code.

2.1.15   Recruit School

The Recruit School validation table is used to validate the type of program/school guarantees codes in the update transactions. Appendix D lists valid codes for Recruit School.

2.1.16   Recruit Type Enlistment

The Recruit Type Enlistment validation table is used to validate the enlistment status codes in the update transactions. Appendix D lists valid codes for Recruit Type of Enlistment.

2.1.17   Reporting Facility

Admitting Facility or Reporting Facility is a five position alphanumeric field showing the Unit Identification Code (UIC) used to identify each activity in the U. S. Navy. Valid values for Reporting Facility are listed in Appendix D.

2.1.18   Re-enlistment QC Code

The Re-enlistment Quality Control Code validation table is used to validate the type re-enlistment recommendation codes in the update transactions. Appendix D lists valid codes for Re-enlistment Quality Control Code.

2.1.19   SSN

The SSN table is used to validate the first three digits of SSNs of the update transactions. Appendix D shows valid values for the first three digits of SSN and the states for which the values are valid.

2.1.20   State Code

The state code validation table is used to validate the numeric value in the state code data element for validity. State code is a two position code which indicates the state or U.S. possession which is a member's home of record at the time of initial entry into the service. Appendix D shows valid values for state codes.

2.1.21   Type Acquisition Code

The Type of Acquisition of an Enlistee Code is a two position numeric field which indicates the type of acquisition of an enlistee. Valid values for this field are listed in Appendix D.

2.1.22   Type Enlistment

Type Enlistment is a two position numeric field which indicates the types of various gains/accessions.

2.2   DYNAMIC INPUT DATA

The CHAMPION database is comprised one large flat data file which is used to maintain data for longitudinal health studies. This file, the CHAMPION database, contains personnel and service history data on all enlisted Navy personnel who have served on active duty since January 1965. The file is to be modified to contain Navy officers as well as Marine Corp officers and enlisted personnel. Ultimately, Army and Air Force data will be included. This file is updated quarterly from data files received from other organizations. These files are reformatted into a common record format which is then used to update the master CHAMPION database. In addition, there are supporting data files which are used in conjunction with the CHAMPION database for research and analysis. One of the supporting files is the Population Denominator Count File. Input data files that are used to update CHAMPION are: Quarterly Navy Enlisted Active Duty

Update, Monthly Navy Enlisted Attrition and Accession, Navy Officer Active Duty Update, Navy Officer Attrition, Navy Reserve, Marine Corps Enlisted and Officer, Marine Corps Enlisted and Officer Attrition, Inpatient, MED Board for Navy and Marine Corps, PEB for Navy and Marine Corps, Deaths for Navy and Marine Corps, Marine Corps Addresses by MCC/RUC, Navy Addresses by UIC, Ports of Call, and HIV Testing. These data files are described in detail in subsequent paragraphs with the file and record layouts shown in Appendix B.

2.2.1   CHAMPION

The CHAMPION database is comprised of variable length records containing data on all Navy enlisted personnel with plans to add Naval officers and Marine Corps officers and enlisted personnel. Each record in the database is variable in length with a fixed section comprising demographic data for a specific member identified by Social Security Number (SSN). The remainder of the record consists of event records which show specific events that occurred during the military service of the member. The Event Codes that can be recorded for a member are shown in Appendix D. The layouts of the events are shown in Appendix B, listed under the CHAMPION file.

2.2.2   Population Denominator Count File

This file contains the official Navy/Marine Corps end strengths by quarter for both enlisted and officer. This file will match the official Navy/USMC published personnel publications.

2.2.3   Quarterly Navy Enlisted Active Duty

This data is received quarterly on magnetic cartridge from the Naval Personnel Research Development Center (NPRDC) and contains the updated status of all Navy

enlisted personnel. Processing of this data cartridge creates the EMR500 data set. Data included in the update are transfers to new units and pay grade changes.

2.2.4   Monthly Navy Enlisted Attrition and Accession

This data is received monthly on magnetic cartridge from NPRDC and contains attrition and accession data on Navy enlisted personnel. Processing of this data cartridge creates the AMON500 data set.

2.2.5   Navy Officer Active Duty

This data is received quarterly on magnetic cartridge from DISA and contains data on Navy officer personnel. Processing of this data cartridge creates the NOVER105 data set.

2.2.6   Navy Officer Attrition

This data is received quarterly on magnetic cartridge from NPRDC and contains attrition and accession data on Navy officer personnel. Processing of this data cartridge creates the NOATT105 data set.

2.2.7   Navy Reserve

This data is received quarterly on magnetic cartridge from the Bureau of Naval Personnel (BUPERS) and contains data on personnel in the Naval Reserve. Processing of this data cartridge creates the NRVER105 data set.

2.2.8   Marine Corps Enlisted and Officer

This data is received quarterly on magnetic cartridge from the NPRDC and contains data on officer and enlisted personnel in the Marine Corps. Processing of this data cartridge creates the MCVER105 data set.

2.2.9   Marine Corps Enlisted and Officer Attrition

This data is received quarterly on magnetic cartridge from the NPRDC and contains attrition and accession data on officer and enlisted personnel in the Marine Corps. Processing of this data cartridge creates the MCATT105 data set.

2.2.10   Inpatient

This data is received quarterly on magnetic cartridge from the NMDSC and contains data on inpatient hospitalizations for enlisted personnel in the Navy. Processing of this data cartridge creates the INPAT105 data set.

2.2.11   Medical Board for Navy and Marine Corps

This data is received quarterly on magnetic cartridge from the Naval Medical Information Management Center (NMIMC} and contains data on medical boards for personnel in the Navy and Marine Corps.Processing of this data cartridge creates the INPAT105 data set.

2.2.12   Physical Evaluation Board for Navy and Marine Corps

This data is received quarterly on magnetic cartridge from NMIMC and contains data on physical evaluation boards for personnel in the Navy and Marine Corps. Processing of this data cartridge creates the PEB105 data set.

2.2.13   Deaths for Navy and Marine Corps

This data is received quarterly on magnetic cartridge from NMIMC and contains data on deaths for personnel in the Navy and Marine Corps. Processing of this data cartridge creates the DEATH117 data set.

2.2.14   Marine Corps Addresses by MCC/RUC

This data is received quarterly on magnetic cartridge from NPRDC and contains data on UIC addresses for the Marine Corps. Processing of this data cartridge creates the MCADDR data set.

2.2.15   Navy Addresses by UIC

This data is received quarterly on magnetic cartridge from NPRDC and contains data on UIC addresses for the Navy. Processing of this data cartridge creates the NAVYADDR data set.

2.2.16   Ports of Call

This data is received quarterly on magnetic cartridge from CNO and contains data on Ports of Call for the Navy. Processing of this data cartridge creates the PORT80 data set.

2.2.17   HIV Testing

This data is received as requested on magnetic cartridge from DMDC and contains data on HIV cases for the Navy and Marine Corps. Processing of this data cartridge creates the NEWDMDCPOS data set.

2.3   DYNAMIC OUTPUT DATA

The CHAMPION database is the dynamic output file, all data elements can be updated during a normal quarterly update. The record layouts for this file are shown in Appendix B with data elements listed in Appendix C.

2.4   DATA CONSTRAINTS

The IBM 4381 mainframe system which is used to process CHAMPION has capacity that is limited only by the number and size of attached disk drives. Currently,

there are 3380 disk drives available that have a total combined capacity of 27 gigabytes of storage.

The capacity required for CHAMPION increases by the execution of each update. The updates add new personnel and new rate change, transfer, and hospitalization sub-records. Since this is a historical database, records are not deleted. On-line storage must be sufficient for TBD CHAMPION records and associated sub-records

SECTION 3

DATA COLLECTION

3.1 REQUIREMENTS AND SCOPE

The CHAMPION database, comprised of the Naval Enlisted Active Duty And Historical Career/Medical Database, contains information on each enlisted member who has been or still is on active duty from January 1, 1965 to the current date. This data base was compiled from the monthly Naval Military Personnel Command (NMPC) change tape extracts dating from January 1, 1965 to June 30, 1973 and the NMPC monthly AMON extract tapes dating from July 1,1973 to the current date. The medical data were compiled from 4 different data bases supplied by the Naval Medical Data Services Center located at Bethesda, MD. The medical data is composed of inpatient hospitalizations, medical boards, physical evaluation boards, and death records.

These files contain data from 1965 to the current date. The above six data bases have been edited, keeping their data elements constant in contents. This data base has currently 3,255,199 members on it and is updated quarterly. The data base is organized in chronological order by event date and event code. Normally, it will track a member from the date of enlistment to the date of discharge.

The data base is organized as variable length records, with the fixed portion of the record referred to as the demographic record. Within the demographic record each member's demographic elements recorded, such as SSN, name, date of birth.

Following the fixed, or demographic, portion of the record, there can be from one to 200 individual events associated with the member, each related to a specific event affecting the member's service.

3.2   INPUT RESPONSIBILITIES

Data received from the various sources is the responsibility of the source, although all data received undergoes extensive editing to ensure only correct data is incorporated. Often, erroneous data is received since some of the data is self reported by the member, or the originator has change the format of the data. When the extensive edits indicate these occurrences, the originator is contacted to clarify or correct the discrepancies.

APPENDIX A

ACRONYMS AND ABBREVIATIONS

ACRONYMS AND ABBREVIATIONS

BUPERS	Bureau of Naval Personnel
CHAMPION	Career History Analytical Medical and Physical Information Open Network
CNO	Chief of Naval Operations
DISA	Defense Information Systems Agency
DMDC	Defense Information Data Center
DoD	Department of Defense
IBM	International Business Machines Corporation
MCC	Monitored Command Code
NHRC	Naval Health Research Center
NMDSC	Monitored Command Code
NMIMC	Naval Medical Information Management Center
NPRDC	Naval Personnel Research Development Center
POC	Point of Contact
RUC	Reporting Unit Code
SSN	Social Security Number
UIC	Unit Identification Code

APPENDIX B
DATABASE DEFINITIONS

APPENDIX B

DATABASE DEFINITIONS

INDEX

APPENDIX C
DATA ELEMENT DICTIONARY

APPENDIX C

CHAMPION DATA ELEMENT DICTIONARY

INDEX

DATA ELEMENTS   **PAGE**

CHAMPION DATA ELEMENT DICTIONARY (Continued)

CHAMPION DATA ELEMENT DICTIONARY (Continued)

CHAMPION DATA ELEMENT DICTIONARY (Continued)

APPENDIX D
STATIC DATA

APPENDIX D
STATIC DATA
INDEX

APPENDIX D

SYSTEM SPECIFICATIONS

SYSTEM SPECIFICATION

for the

CHAMPION

(Career History Analytical

Medical and Physical

Information Open Network)

RESEARCH DATABASE

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

SECTION 1

GENERAL

1.1 PURPOSE OF THE SYSTEM SPECIFICATION

This System Specification (SS) for the Career History Analytical Medical and Physical Information Open Network (CHAMPION) System is written to fulfill the following objectives:

- To provide a detailed definition of the system functions,

- To communicate details of the on-going analysis between the user's operational personnel and the appropriate development personnel, and

- To define in detail the interfaces with other systems and subsystems and the facilities to be utilized for accomplishing the interfaces.

1.2 PROJECT REFERENCES

The CHAMPION system is a computerized medical and personnel database that provides extensive information for Naval medical management for occupational health and epidemiologic research. The system was developed by the Naval Health Research Center (NHRC), San Diego, CA, in association with the Air Force and Army. The mission of the Naval Health Research Center, as assigned by the Secretary of the Navy, and two of the functions to be performed to accomplish the mission, as assigned by the Commander, Naval Medical Command (NHRCINST 5450.1E), are:

To support fleet operational readiness through research, development, testing, and evaluation on the biomedical and psychological aspects of Navy and Marine Corps personnel health and performance, and to perform such other functions or tasks as may be directed by higher authority.

As directed by the Commanding Officer, Naval Medical Research and Development Command, Bethesda, Maryland:

a. Conduct occupational health and safety studies of the Naval service to: identify environmental hazards in the workplace and aboard ship; assess the impact of potentially harmful agents or conditions on health and performance; determine causal factors in illness and accidents; and to develop cost-effective intervention strategies.

b. Maintain data files of medical and service history information for all Naval personnel to: serve as the basis for longitudinal health studies on morbidity, disability, and mortality in relation to demographic, occupational, environmental, psychological, and service history variables; identify health and safety risks to Naval personnel; and to assess the impact of chronic disease on performance and retention.

Pertinent references follow:

a. Documentation for the CHAMPION system will be in accordance with:

(1) Life Cycle Management of Automated Information Systems, DoD Directive 7920.1, 17 October 1978;

(2) DoD Automated Information Systems Documentation Standards Manual, DoD STD 7935A, 31 October 1988; and

(3) DoD Automated Information System Life Cycle Management Manual, DoD Manual 7920.2M, 1 March 1990.

(4) *Guidelines* For Documentation of Computer Programs and Automated Data Systems.

b. The following documents were used as references for this SS:

(1) A Guide to the Computerized Medical Data Resources of the Naval Health Research Center, Report Number 87-13;

1.3 TERMS AND ABBREVIATIONS

AIS	Automated Information System
BUMED	Bureau of Medicine. For this document BUMED is a User-ID on the IBM mainframe.
BUPERS	Bureau of Naval Personnel
CHAMPION	Career History Analytical Medical and Physical Information Open Network
CMS	Conversational Mode System
CNO	Chief of Naval Operations
COBOL	Common Business Oriented Language
DDN	Defense Data Network
DEC	Digital Equipment Corporation
DISA	Defense Information Systems Agency
DMDC	Defense Manpower Data Center
DOB	Date of Birth
DoD	Department of Defense
DOS	Disk Operating System
DRD	Data Requirements Document

DSN	Data Set Name
EMF	Enlisted Master File
EPISYS	Epidemiological Projection Interactive System
IBM	International Business Machines
HIV	Human Immunodefiency Virus
LAN	Local Area Network
MCC	Monitored Command Code
NHRC	Naval Health Research Center
NMDSC	Naval Medical Data Services Center
NMIMC	Naval Medical Information Management Center
NPRDC	Naval Personnel Research Development Center
PC	Personal Computer
PDC	Population Denominator Count
PEB	Physical Evaluation Board
RUC	Reporting Unit Code
SAS	Statistical Analysis System
SS	System Specification
SSN	Social Security Number
TCP/IP	Transmission Control Protocol/Internetwork Protocol
UIC	Unit Identification Code
USMC	United States Marine Corps
USNR	United States Naval Reserve
VM	Virtual Machine

SECTION 2

SUMMARY OF REQUIREMENTS

2.1   SYSTEM DESCRIPTION

Computerized medical files were first established by NHRC in the late 1960's to investigate the epidemiology of psychiatric disorders. In 1975, the mission of NHRC was broadened from primarily psychiatric research to include the investigation of all types of disease and injury. Research programs in occupational medicine and epidemiology were developed in the late 1970's when it became apparent that these files would have special value for occupational health.

The CHAMPION system is comprised of one large flat data file which is used to maintain data for longitudinal health studies. This file, the Service History File, contains personnel and service history data on all enlisted Navy personnel who have served on active duty since January 1965. It is being modified to include data on Navy officer and Marine Corps officer/enlisted personnel. Additionally, the file is being mapped for use by the Army and Air Force. This file is updated from various files received from other organizations, as detailed in Section 4. These files are reformatted into a common record format which is then used to update the master CHAMPION database. In addition, there are supporting data files which are used in conjunction with Service History File for research and analysis. One of these is the Population Denominator Count File. The following paragraphs describe the CHAMPION system and the processes used to update and maintain the data files.

2.1.1   CHAMPION System Relationships

Processing of the CHAMPION function at NHRC consists of receiving updated data on cartridges and processing quarterly updates. Prior to the update process, each tape is copied and reformatted into the common format. Figure 2-1 depicts the major data flows coming into the CHAMPION system.

Figure 2-1 CHAMPION Data Flow Diagram

NAVY AND MARINE TOTAL FORCE HISTORY
DATABASE UPDATE EXTRACT AND REPORTING
OVERVIEW

Navy Enlisted Master
Navy Enlisted Accession Attritions
Navy Officer Master
Navy Officer Accession Attritions
Navy Reserve
USMC Master
USMC Accession Attritions
Navy/ USMC Inpatient Data
Navy/ USMC MedBoard Data
Navy/ USMC PebBoard Data

USMC Address Data
Navy Address Data
Navy/ USMC Death Data
Navy Ship Deployment Data
Navy/ USMC HIV Data

TOTAL FORCE DATABASE UPDATE

TOTAL FORCE DATABASE

COBOL AND SAS EXTRACTS

EXTRACT DATABASE
EXTRACT DATABASE
EXTRACT DATABASE

SAS ANALYSIS
EPISYS STATISTICAL ANALYSIS
OTHER STATISTICAL ANALYSES

SAS REPORTS
EPISYS REPORTS
ANALYSES REPORTS

2.2   SYSTEM FUNCTIONS

The functions of CHAMPION include converting data cartridges to the common format, updating the master database, extracting data, and printing reports. The CHAMPION system supports these functional areas with the following components: Quarterly Navy Enlisted Active Duty Update, Monthly Navy Enlisted Attrition and Accession, Navy Officer Active Duty Update, Navy Officer Attrition, Navy Reserve, Marine Corps Enlisted and Officer, Marine Corps Enlisted and Officer Attrition, Inpatient, MED Board for Navy and Marine Corps, Physical Evaluation Board (PEB) for Navy and Marine Corps, Deaths for Navy and Marine Corps, Marine Corps Addresses by MCC/RUC, Navy Addresses by UIC, and Ports of Call.

All COBOL programs and CMS EXECs are located on CMS minidisk with the User-ID BUMED. The following paragraphs itemize and discuss requirements specific to each of these components.

2.2.1   <u>Quarterly Navy Enlisted Active Duty Update</u>

This data, the EMR500, is received quarterly on magnetic cartridge from the Naval Personnel Research Development Center (NPRDC) and contains the official Navy strengths of Navy enlisted personnel. Data extracted from this file include transfers to new duty stations and changes in pay grade. The process is depicted in Figure 2-2. General information for resolution of discrepancies is listed below.

Originator:	NPRDC
Point of Contact:	MAPCOM
Extension:	553-7823
Category/DSN:	EMT EXT/S177
Event Codes Created:	501, 502

Step 1   Copy the input data set and reblock to EMR500 output dataset.

NHRC Dataset:	EMR500
SAS PROGRAM:	EMRCOPY
CMS EXEC:	EMRCOPY
Output Dataset:	EMR500

Step 2   SAS analysis of raw data variables.

NHRC Dataset:	EMR500
SAS PROGRAM:	EMR500
CMS EXEC:	EMR500
Output Dataset:	REPORT

Step 3   Edit and reformat variables into a common record format.

NHRC Dataset:	EMR500
COBOL PROGRAM:	NEVER105
CMS EXEC:	NEVER105
Output Dataset:	NEVER105

Figure 2-2   EMR500 Processing Flow

NPRDC QUARTERLY NAVY ENLISTED
RAW DATA POC=MAPCOM X-37823
INPUT DSN=ERRR02PM.ER12S177

```
        ( EMT )
        ( EXT )
        ( S177 )
           |
           v
    +-----------------+      This program
    |    VERJCL       |......copies the raw
    |    EMRCOPY      |      data into and
    +-----------------+      reblocks into
           |                 EMR500 output.
           v
        ( EMR )        ( TO )
        ( 500 )------->( UPDATE )
           |           ( HIST )
           |           ( Page 1 )
           v
    +-----------------+
    |  SAS EMR500     |......This SAS Procudure
    +-----------------+      is used to view the
           |                 raw data variables
           v
    +-----------------+
    |    SAS          |
    |  ANALYSIS       |
    +-----------------+

                              This program
                              edits and
    +-----------------+      reformats
    |  VER105COB      |......variables into a
    |  NEVER105       |      common format.
    +-----------------+
           |
           v
        ( NEVER )      ( TO SSN )
        ( 105 )------->( VERIFY )
                       ( Page 1 )
```

2.2.2   Monthly Navy Enlisted Attrition and Accession

This data is received monthly on magnetic cartridge from the Naval Personnel Research Development Center (NPRDC) and contains attrition and accession data on Navy enlisted personnel.   The process is depicted in Figure 2-3.   General information is listed below.

Originator:	NPRDC
Point of Contact:	MAPCOM
Extension:	553-7823
Category/DSN:	AMON/S184
Event Codes Created:	100-199, 301, 328, 344, 381, 382, 383, 384, 385, 386, 387, 388, 389, 391, 801-998

Step 1   **Copy the input data set and reblock to AMON500 output dataset.**

NHRC Dataset:	AMON500
SAS PROGRAM:	AMONCOPY
CMS EXEC:	AMONCOPY
Output Dataset:	AMON500

Step 2   **SAS analysis of raw data variables.**

NHRC Dataset:	AMON500
SAS PROGRAM:	AMON500
CMS EXEC:	AMON500
Output Dataset:	REPORT

Step 3   **NHRC Dataset:**   AMON500

COBOL PROGRAM:	NEATT105
CMS EXEC:	NEATT105
Output Dataset:	NEATT105

Figure 2-3 AMON500 Processing Flow

NPRDC QUARTERLY NAVY ENLISTED
ATTRITIONS AND ACCESSIONS
POC=MAPCOM X-37823
INPUT DSN=ER470APR.ER315184

AMON
S184

VERJCL
AMONCOPY

This program
copies the raw
data into and
reblocks into
AMON500 output.

AMON
500

TO
UPDATE
HIST
Page 1

SAS AMON500

This SAS Procudure
is used to view the
raw data variables

SAS
ANALYSIS

VER105COB
NEATT105

This program
edits and
reformats
variables into a
common format.

NE
ATT
105

TO SSN
VERIFY
page 1

2-8

2.2.3 Navy Officer Active Duty Update

This data is received quarterly on magnetic cartridge from Defense Information Systems Agency (DISA) and contains data on Navy officer personnel. The process is depicted in Figure 2-4. General information is listed below.

Originator:	DISA/BUPERS/DMC-C
Point of Contact:	MAPCOM
Extension:	553-7823
Category/DSN:	OMF HIS S205
Event Codes Created:	501, 502

Step 1   **Copy the input data set and reblock to OMR1635 output dataset.**

NHRC Dataset:	ORN524PX.ORPT5205
SAS PROGRAM:	COPYFILE
CMS EXEC:	COPYFILE
Output Dataset:	NO1635

Step 2   **SAS analysis of raw data variables.**

NHRC Dataset:	NO1635
SAS PROGRAM:	NO1635
CMS EXEC:	NO1635
Output Dataset:	REPORT

Step 3

NHRC Dataset:	NO1635
COBOL PROGRAM:	NOVER105
CMS EXEC:	NOVER105
Output Dataset:	NOVER105

Figure 2-4 NO1635 Processing Flow

DISA QUARTERLY NAVY OFFICER
RAW DATA POC=MAPCOM X-37823
INPUT DSN=ORN524PX.ORPT5205

```
                    ( OMF
                      HIS
                      S205 )
                        |
                        v
              +------------------+         This program
              |    VERJCL        | ....... copies the raw
              |   COPYFILE       |         data into and
              |     SAS          |         reblocks into
              +------------------+         NO1635 output.
                        |
                        v
                    (  NO  )          ( TO
                    ( 1635 )--------->( UPDATE
                        |             ( HIST
          +-------------+             ( Page 1 )
          |             |
          v             |
  +----------------+    |          This SAS Procudure
  |  SAS NO1635    |....|......... is used to view the
  +----------------+    |          raw data variables
          |             |
          v             |
  +----------------+    |
  |    SAS         |    |
  |  ANALYSIS      |    |
  +----------------+    |
                        |
                        v
              +------------------+         This SAS Procudure
              |   SAS EMR500     | ....... is used to view the
              +------------------+         raw data variables
                        |
                        v
                    ( EMR  )
                    ( 500  )
                        |
                        v
              +------------------+
              |  VER105COB       |
              |  TFSRT105        |
              |  ACTIVE DUTY     |
              +------------------+
                        |          Sort SSN,Reg/
                        v          Res,,Process
  ( TO SSN )        ( TF   )       Date, Pay
  ( VERIFY )<-------( VER  )
  ( page 1 )        ( 105  )
```

2.2.4   Navy Officer Attrition

This data is received quarterly on magnetic cartridge from the NPRDC and contains attrition and accession data on Navy officer personnel. The process is depicted in Figure 2-5. General information is listed below.

Originator:	NPRDC
Point of Contact:	MAPCOM
Extension:	553-7823
Category/DSN:	OMF ATTR S204
Event Codes Created:	801-998

Step 1   Copy the input data set and reblock to NO1635 output dataset.

NHRC Dataset:	OMF ATTR S204
SAS PROGRAM:	COPYFILE
CMS EXEC:	COPY1635
Output Dataset:	NOATT105

Step 2   SAS analysis of raw data variables.

NHRC Dataset:	NOATT1635
SAS PROGRAM:	NOAT1635
CMS EXEC:	NOAT1635
Output Dataset:	REPORT

Step 3

NHRC Dataset:	NO1635
COBOL PROGRAM:	NOATT105
CMS EXEC:	NOATT105
Output Dataset:	NOATT105

Figure 2-5 NOATT1635 Processing Flow

NPRDC QUARTERLY NAVY OFFICER
ATTRITION POC=MAPCOM X-37823
INPUT DSN=ORN523PX.ORPT5204

```
        ( OMF
          ATTR
          S204 )
            |
            v
  +------------------+       This program
  |     VERJCL       | ....  copies the raw
  |    COPY1635      |       data into and
  |  SAS COPYFILE    |       reblocks into
  +------------------+       output.
            |
            v
      (  NO  )        (  TO  )
      ( ATTR ) -----> ( UPDATE )
      ( 1635 )        (  HIST  )
            |          ( Page 1 )
            |               |
            |               v
            |      +------------------+
            |      |  SAS NOAT1635    |
            |      +------------------+
            |               |
            |               v
            |      +------------------+
            |      |     SAS          |
            |      |   ANALYSIS       |
            |      +------------------+
            |
            v
  +------------------+       This program
  |   VER105COB      | ....  edits and
  |   NOATT105       |       reformats
  +------------------+       variables into a
            |               common format.
            v
      (  NO  )
      ( ATT  )
      ( 105  )
            |
            v                Sort SSN,Reg/
  +------------------+ ....  Res,,Process
  |   VER105COB      |       Date, Pay
  |   TFSRT105       |
  +------------------+
            |
            v
      (  NO  )
      ( ATT  )
      ( 105  )
            |
            v
      (  TO   )
      (  SSN  )
      ( VERIFY )
      ( PAGE 1 )
```
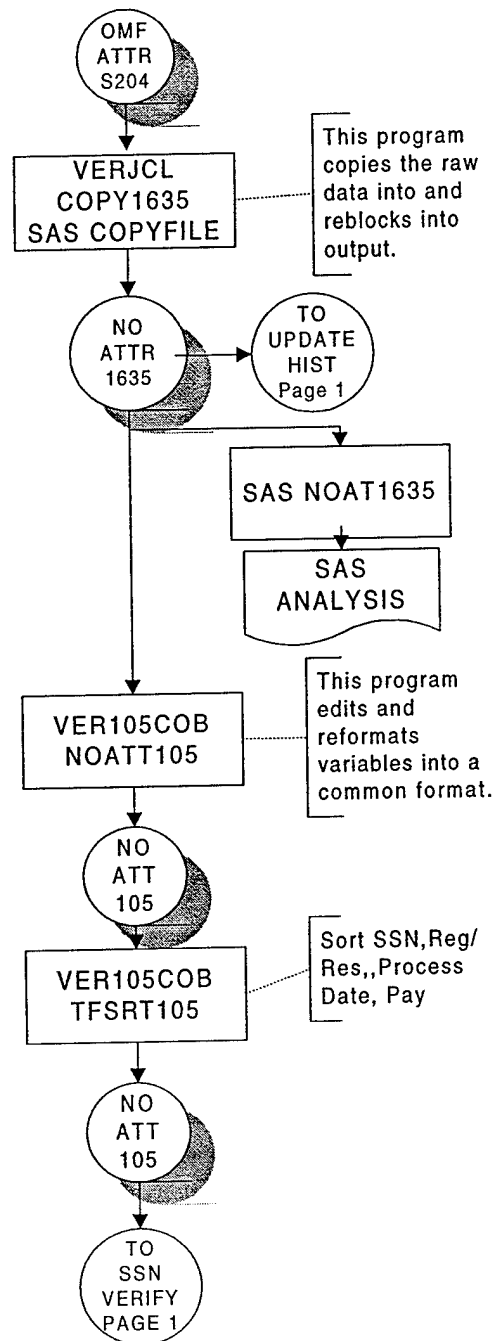
2.2.5   Navy Reserve-BUPERS

This data is received quarterly on magnetic cartridge from the Bureau of Naval Personnel (BUPERS) and contains data on personnel in the Naval Reserve. The process is depicted in Figure 2-6. General information is listed below.

Originator:	BUPERS
Point of Contact:	HELP DESK
Extension:	703-614-5755
Category/DSN:	USNR165
Event Codes Created:	301,344

Step 1   **Copy the input data set and reblock to INRP output dataset.**

NHRC Dataset:	IF338QPX.INRPS007
SAS PROGRAM:	COPYFILE
CMS EXEC:	COPY165
Output Dataset:	USNR165

Step 2   **SAS analysis of raw data variables.**

NHRC Dataset:	USNR165
SAS PROGRAM:	USNR165
CMS EXEC:	USNR165
Output Dataset:	REPORT

Step 3   **NHRC Dataset:**   USNR165

COBOL PROGRAM:	NRVER105
CMS EXEC:	NRVER105
Output Dataset:	NRVER105

Figure 2-6 USNR165 Processing Flow

NPRDC QUARTERLY USNR
ENLISTED AND OFFICERS POC=BUPERS
INPUT DSN=IF336QPX.INRPS007

USNR
165

VERJCL
COPY165
SAS COPYFILE

This program
copies the raw
data into and
reblocks into
output.

USNR
165

TO
UPDATE
HIST
Page 1

SAS USNR165

SAS
ANALYSIS

VER105COB
NEVER105

This program
edits and
reformats
variables into a
common format.

NRVER
105

VER105COB
TFSRT105

Sort SSN,Reg/
Res,,Process
Date, Pay

NRVER
105

TO
SSN
VERIFY
PAGE 1

2.2.6   Navy Reserve- DMDC

This data is received quarterly on magnetic cartridge from the Defense Manpower Data Center (DMDC) and contains data on personnel in the Naval Reserve. The process is depicted in Figure 2-7. General information is listed below.

Originator:	DMDC
Point of Contact:	Ginger Basset
Extension:	408-655-0400
Category/DSN:	USNR450
Event Codes Created:	301,344

Step 1   **Copy the input data set and reblock to INRP output dataset.**

NHRC Dataset:	IE065MD4.CP2R210E
SAS PROGRAM:	COPYFILE
CMS EXEC:	COPY450
Output Dataset:	USNR450

Step 2   **SAS analysis of raw data variables.**

NHRC Dataset:	USNR450
SAS PROGRAM:	USNR450
CMS EXEC:	USNR450
Output Dataset:	REPORT

Step 3

NHRC Dataset:	USNR450
COBOL PROGRAM:	NRVMAR94
CMS EXEC:	NRVSEP94
Output Dataset:	NRVER450

Figure 2-7 USNR450 Processing Flow

NPRDC QUARTERLY USNR
ENLISTED AND OFFICERS POC=DMDC
INPUT DSN=USNR450

USNR 450 OFF

USNR 450 ENL

This program copies the raw data into and reblocks into output.

VERJCL
COPY450
SAS COPYFILE

USNR 450

SAS NOAT450

This SAS Procudure is used to view the raw data variables

SAS ANALYSIS

NRVSEP94
NRVMAR94/
NRVER450

This program edits and reformats variables into a common format.

NRVER 450

VER105COB
TFSRT105

Sort SSN,Reg/ Res,,Process Date, Pay

NRVER 450

TO SSN VERIFY PAGE 1

2.2.7   Marine Corps Enlisted and Officer

This data is received quarterly on magnetic cartridge from the NPRDC and contains data on officer and enlisted personnel in the Marine Corps. File length has changed in September 1992 from 1200 characters to 1500 characters. In June 1993 the format for the primary dependents changed from positions 671-672 to 681-682. The process is depicted in Figure 2-8. General information is listed below.

Originator:	NPRDC
Point of Contact:	MAPCOM
Extension:	553-7823
Category/DSN:	MC1500
Event Codes Created:	100-199, 301, 328, 344, 381, 382, 383, 384, 385, 386, 387, 388, 389, 391, 801-998

Step 1   Copy the input data set and reblock to HMF9503 output dataset.

NHRC Dataset:	HMF9412
SAS PROGRAM:	COPYFILE
CMS EXEC:	COPY1500
Output Dataset:	MC1500

Step 2   SAS analysis of raw data variables.

NHRC Dataset:	MC1500
SAS PROGRAM:	MC1500
CMS EXEC:	MC1500
Output Dataset:	REPORT

Step 3   **NHRC Dataset:**   MC1500

           COBOL PROGRAM: MCVSEP94

           CMS EXEC: MCVSEP94

           Output Dataset: MCVER105

Figure 2-8 MC1500 Processing Flow

NPRDC QUARTERLY MARINE CORPS
RAW DATA POC=MAPCOM X-37823
INPUT DSN=HMF9412
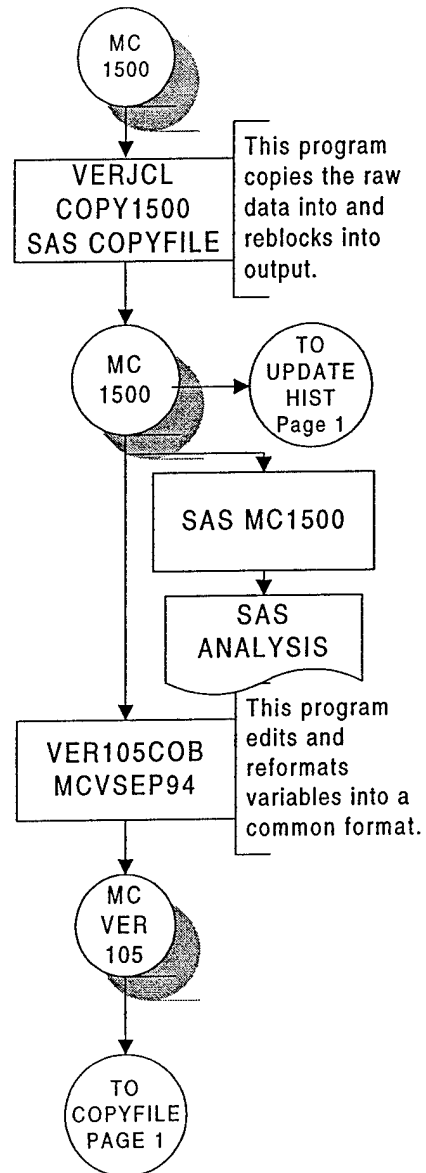
MC
1500

VERJCL
COPY1500
SAS COPYFILE

This program
copies the raw
data into and
reblocks into
output.

MC
1500

TO
UPDATE
HIST
Page 1

SAS MC1500

SAS
ANALYSIS

VER105COB
MCVSEP94

This program
edits and
reformats
variables into a
common format.

MC
VER
105

TO
COPYFILE
PAGE 1

2.2.8   Marine Corps Enlisted and Officer Attrition

This data is received quarterly on magnetic cartridge from the NPRDC and contains attrition and accession data on officer and enlisted personnel in the Marine Corps. The process is depicted in Figure 2-9. General information is listed below.

Originator:	NPRDC
Point of Contact:	MAPCOM
Extension:	553-7823
Category/DSN:	USMC429
Event Codes Created:	801-999

Step 1   **Copy the input data set and reblock to USMC429 output dataset.**

NHRC Dataset:	USMC429
SAS PROGRAM:	COPYFILE
CMS EXEC:	COPY429
Output Dataset:	USMC429

Step 2   **SAS analysis of raw data variables.**

NHRC Dataset:	USMC429
SAS PROGRAM:	USMC429
CMS EXEC:	USMC429
Output Dataset:	REPORT

Step 3   **NHRC Dataset:**   USMC429

COBOL PROGRAM:	MCADEC92
CMS EXEC:	MCADEC92
Output Dataset:	MCATT105

2-20

Figure 2-9 MC429 Processing Flow

MARINE CORPS ATTRITION QUARTERLY
POC=MAPCOM X-37823
INPUT DSN=USMC429.MAR95.Q1CY95AR

MC
ATTR

VERJCL
COPY429
SAS

This program
copies the raw
data into and
reblocks into
output.

MC
ATTR
429

TO
UPDATE
HIST
Page 1

SAS MCATT429

SAS
ANALYSIS

VERCOB105
MCADEC92

This program
edits and
reformats
variables into a
common format.

MC
ATT
105

VERCOB105
TFSRT105

Sort SSN,Reg/
Res,,Process
Date, Pay

MC
ATT
105

To SSN
VERIFY
Page 1
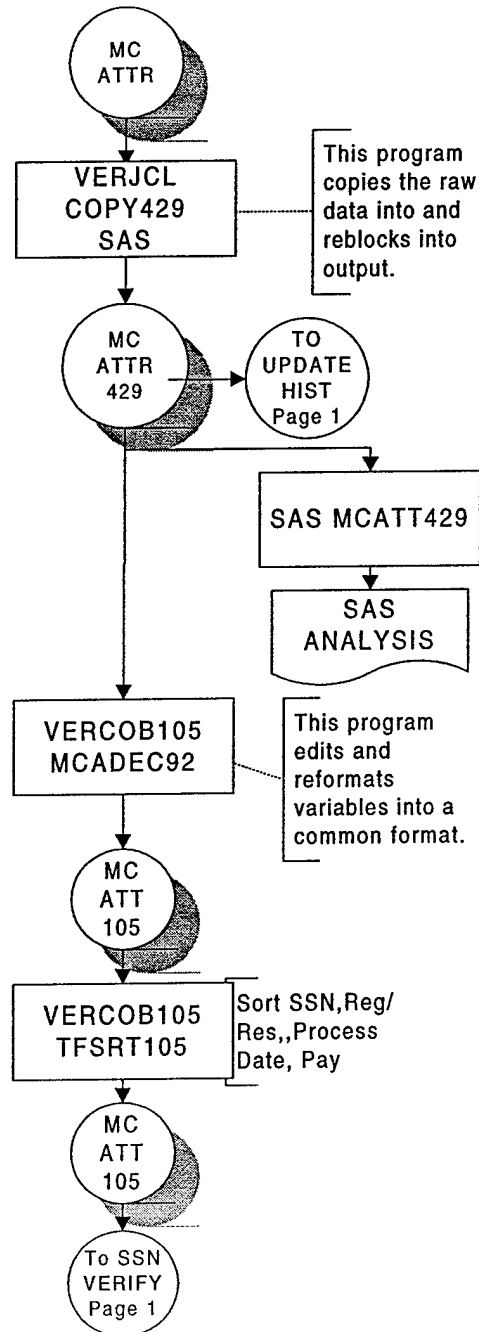
2.2.9   Inpatient

This data is received quarterly on magnetic cartridge from the Naval Medical Data Services Center (NMDSC) and contains data on inpatient hospitalizations for enlisted personnel in the Navy. The process is depicted in Figure 2-10. General information is listed below.

Originator:	NMDSC
Point of Contact:	Bill Jarvis
Extension:	301-295-3264
Category/DSN:	INPAT504
Event Codes Created:	601-608

Step 1   **Copy the input data set and reblock to INPAT504 output dataset.**

NHRC Dataset:	HIP.DHSE.DATA9412
SAS PROGRAM:	COPYFILE
CMS EXEC:	COPY504
Output Dataset:	INPAT504

Step 2   **SAS analysis of raw data variables.**

NHRC Dataset:	INPAT504
SAS PROGRAM:	INPAT504
CMS EXEC:	INPAT504
Output Dataset:	REPORT

Step 3

NHRC Dataset:	INPAT504
COBOL PROGRAM:	INPAT504
CMS EXEC:	INPAT504
Output Dataset:	INPAT105

Figure 2-10 INPAT504 Processing Flow

USMC/NAVY INPATIENT QUARTERLY
POC=NMIMC (Bill Jarvis)
INPUT DSN=HIP.DHSE.DATA9412

```
                    ┌─────────┐
                   ( INPAT   )
                    ( 504    )
                    └────┬────┘
                         │
              ┌──────────▼──────────┐          ┌──────────────────┐
              │     VERJCL          │          │ This program     │
              │     COPY504         │----------│ copies the raw   │
              │     SAS             │          │ data into and    │
              └──────────┬──────────┘          │ reblocks into    │
                         │                      │ output.          │
                         ▼                      └──────────────────┘
                    ┌─────────┐
                   ( INPAT   )
                    ( 504    )
                    └────┬────┴──────────┐
                         │               ▼
                         │      ┌──────────────────┐
                         │      │  SAS INPAT504    │
                         │      └────────┬─────────┘
                         │               ▼
                         │          ┌─────────┐
                         │          │   SAS   │
                         │          │ ANALYSIS│
                         │          └─────────┘
                         │
              ┌──────────▼──────────┐          ┌──────────────────┐
              │                     │◄─────────│     NHRC         │
              │     DERV504         │          │  DIAGNOSES       │
              │                     │          │    TABLE         │
              └──────────┬──────────┘          └──────────────────┘
                         │
                         ▼                      ┌──────────────────┐
                    ┌─────────┐                 │ This program     │
                   ( INPAT   )                  │ edits and        │
                    ( 117    )..................│ reformats        │
                    └────┬────┘                 │ variables into a │
                         │                      │ common format.   │
                         ▼                      └──────────────────┘
                    ┌─────────┐
                   (   To    )
                   ( UPDATE  )
                   ( HISTORY )
                   ( Page 1  )
                    └─────────┘
```
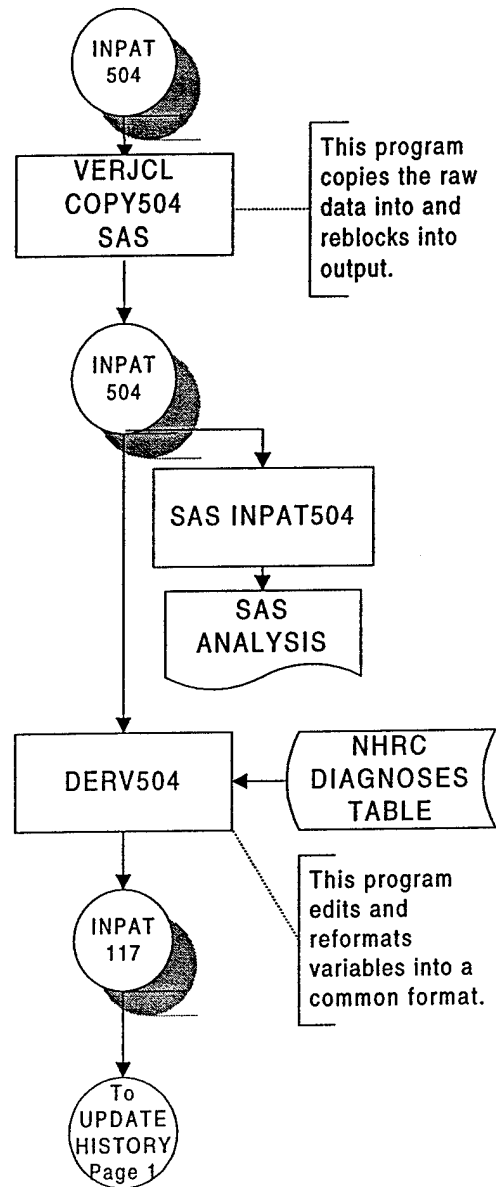
2.2.10   Medical Board for Navy and Marine Corps

This data is received quarterly on magnetic cartridge from the Naval Medical Information Management Center (NMIMC) and contains data on medical boards for personnel in the Navy and Marine Corps. The process is depicted in Figure 2-11. General information is listed below.

Originator:	NMIMC
Point of Contact:	Bill Jarvis
Extension:	301-295-3264
Category/DSN:	MED300
Event Codes Created:	611

Step 1   **Copy the input data set and reblock to MED300 output dataset.**

NHRC Dataset:	MED.MBDFILE.MAR93
SAS PROGRAM:	COPY300
CMS EXEC:	COPYFILE
Output Dataset:	MED300

Step 2   **SAS analysis of raw data variables.**

NHRC Dataset:	MED300
SAS PROGRAM:	MED300
CMS EXEC:	MED300
Output Dataset:	REPORT

Step 3

NHRC Dataset:	MED300
COBOL PROGRAM:	MED300
CMS EXEC:	MED300
Output Dataset:	MED117

Figure 2-11 MED300 Processing Flow

MEDBOARD QUARTERLY USMC/NAVY
RAW DATA POC=NMIMC
INPUT DSN=MED.MBDFILE.MAR95

MED 300

**VERJCL
COPY300
SAS**

This program
copies the raw
data into and
reblocks into
output.

MED 300

SAS MED300

SAS ANALYSIS

This program
edits and
reformats
variables into a
common format.

MEDEDIT

MED 117

To SSN
VERIFY
Page 3

**This section of
the system is
under
development**
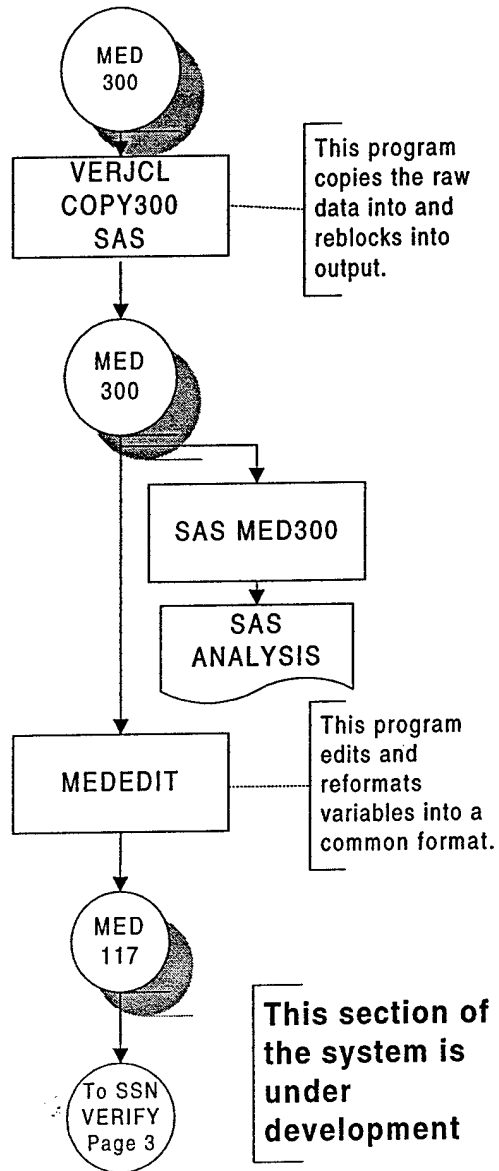
2.2.11   Physical Evaluation Board for Navy and Marine Corps

This data is received quarterly on magnetic cartridge from NMIMC and contains data on physical evaluation boards for personnel in the Navy and Marine Corps. The process is depicted in Figure 2-12. General information is listed below.

Originator:	NMIMC
Point of Contact:	Bill Jarvis
Extension:	301-295-3264
Category/DSN:	PEB105
Event Codes Created:	612

Step 1   Copy the input data set and reblock to PEB105 output dataset.

NHRC Dataset:	PEB105
SAS PROGRAM:	COPYFILE
CMS EXEC:	COPY105
Output Dataset:	PEB105

Step 2   SAS analysis of raw data variables.

NHRC Dataset:	PEB105
SAS PROGRAM:	PEB105
CMS EXEC:	PEB105
Output Dataset:	REPORT

Step 3

NHRC Dataset:	PEB105
COBOL PROGRAM:	PEBEDIT
CMS EXEC:	PEB105
Output Dataset:	PEB105

Figure 2-12 PEB105 Processing Flow

PEB BOARD QUARTERLY
POC=NMDSC
INPUT DSN=VARIES

PEB
105

VERJCL
COPY105
SAS

This program
copies the
raw data into
and reblocks
into output.

PEB
105

SAS PEB105

SAS
ANALYSIS

PEBEDIT

This program
edits and
reformats
variables into a
common format.

PEB
117

To SSN
VERIFY
Page 3
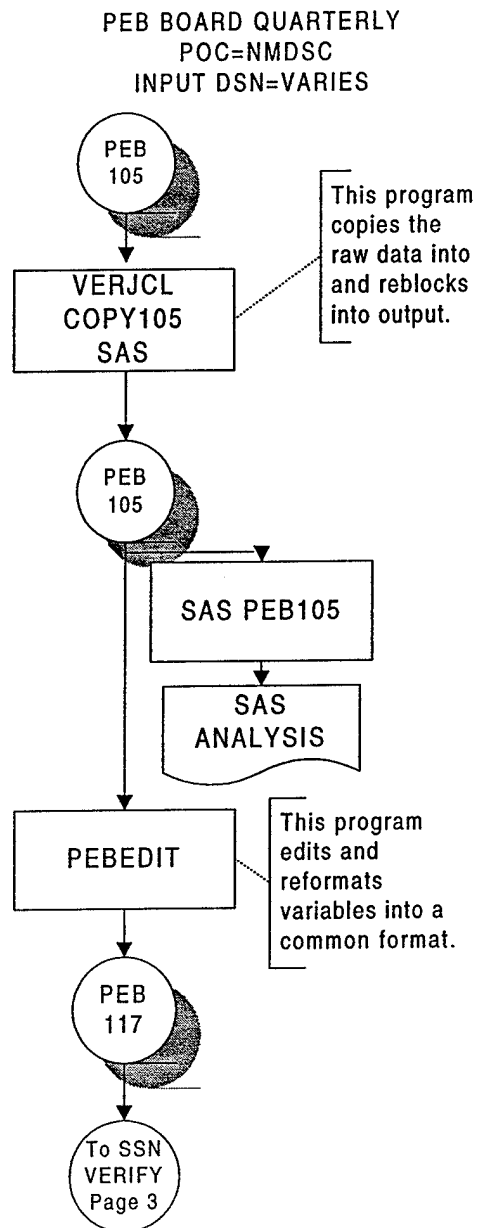
2.2.12   Deaths for Navy and Marine Corps

This data is received quarterly on magnetic cartridge from NMIMC and contains data on deaths for personnel in the Navy and Marine Corps. The process is depicted in Figure 2-13. General information is listed below.

Originator:	NMIMC
Point of Contact:	Bill Jarvis
Extension:	301-295-3264
Category/DSN:	DEATH 93
Event Codes Created:	613

Step 1   **Copy the input data set and reblock to filename output dataset.**

NHRC Dataset:	SC3DCM.DEATH.MAST
SAS PROGRAM:	COPYFILE
CMS EXEC:	COPY93
Output Dataset:	DEATH93

Step 2   **SAS analysis of raw data variables.**

NHRC Dataset:	DEATH93
SAS PROGRAM:	DEATH93
CMS EXEC:	DEATH93
Output Dataset:	REPORT

Step 3

NHRC Dataset:	DEATH93
COBOL PROGRAM:	DEATHEDIT
CMS EXEC:	DEATHEDIT
Output Dataset:	DEATH117

Figure 2-13 DEATH 93 Processing Flow

DEATH QUARTERLY
POC=NMDSC
INPUT DSN=SC3DCM.DEATH.MAST

DEATH 93

VERJCL COPY93 SAS — This program copies the raw data into and reblocks into output.

DEATH 93

SAS DEATH93

SAS ANALYSIS

DEATHEDIT — This program edits and reformats variables into a common format.

DEATH 117

To SSN VERIFY Page 2
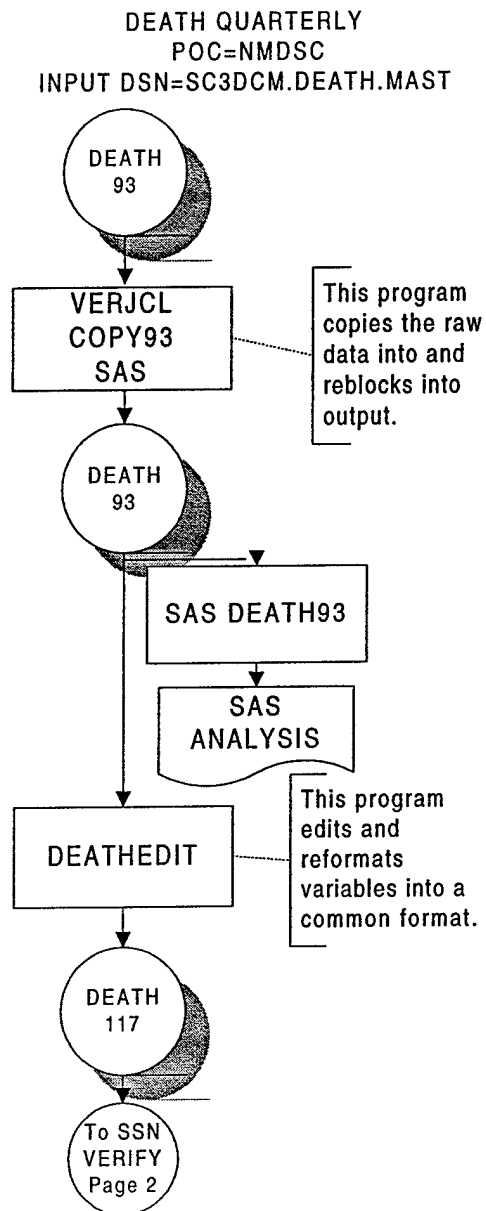
2.2.13   Marine Corps Addresses by MCC/RUC

This data is received quarterly on magnetic cartridge from NPRDC and contains data on UIC addresses for the Marine Corps. The process is depicted in Figure 2-14. General information is listed below.

Originator:	NPRDC
Point of Contact:	Carol Mullins
Extension:	553-0538
Category/DSN:	MCADDR
Event Codes Created:	N/A

Step 1   **Copy the input data set and reblock to MCADDR output dataset.**

NHRC Dataset:	MCADDR
SAS PROGRAM:	COPYFILE
CMS EXEC:	COPYADDR
Output Dataset:	MCADDR

Step 2   **NHRC Dataset:**   MCADDR

COBOL PROGRAM:	USMCADDR
CMS EXEC:	USMCADDR
Output Dataset:	MCADDR

Figure 2-14 Marine Corps Addresses Processing Flow

USMC MCC/RUC ADDRESS QUARTERLY
RAW DATA POC=NPRDC
INPUT DSN=VARIES

MC
ADDR

VERJCL
COPY
SAS

This program
copies the raw
data into and
reblocks into
output.

MC
ADDR

USMC ADDR

This program
edits and
reformats
variables into a
common format.

MC
ADDR

To UIC
UPDATE
UNDER
DEVELOP
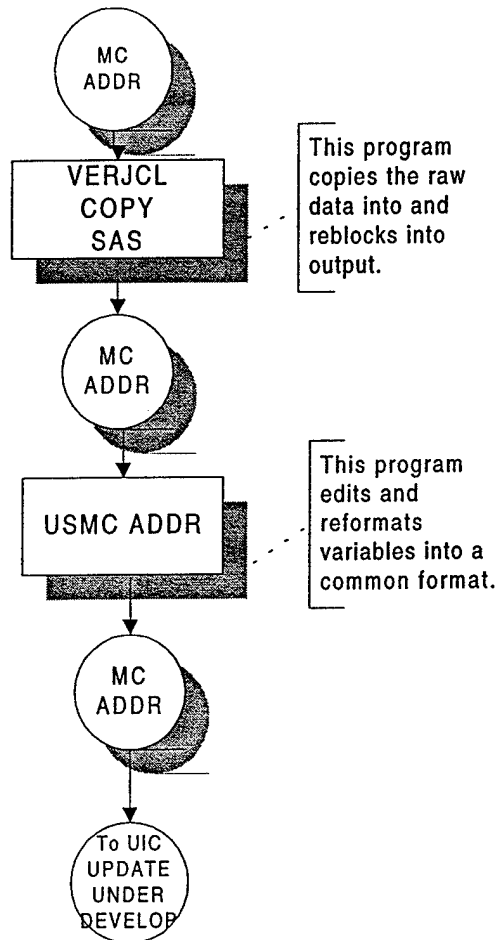
2.2.14   Navy Addresses by UIC

This data is received quarterly on magnetic cartridge from NPRDC and contains data on UIC addresses for the Navy. The process is depicted in Figure 2-15. General information is listed below.

Originator:	NPRDC
Point of Contact:	MAPCOM
Extension:	37823
Category/DSN:	NAVYADDR
Event Codes Created:	N/A

Step 1   **Copy the input data set and reblock to NAVYADDR output dataset.**

NHRC Dataset:	NAVYADDR
SAS PROGRAM:	COPYFILE
CMS EXEC:	COPY580
Output Dataset:	NAVYADDR

Step 2   **NHRC Dataset:**   NAVYADDR

COBOL PROGRAM:	NAVYADD
CMS EXEC:	NAVYADD
Output Dataset:	NAVYADDR

Figure 2-15 Navy Addresses Processing Flow

NAVY ADDRESS (UIC) QUARTERLY
POC=NPRDC
INPUT DSN=AM4096XPP.AMT3S040

NAVY ADDR

VERJCL COPY580 SAS — This program copies the raw data into and reblocks into output.

ADD 580

NAVY ADDRESS — This program edits the Navy Address File

ADD 580

To UIC UPDATE UNDER DEVELOP
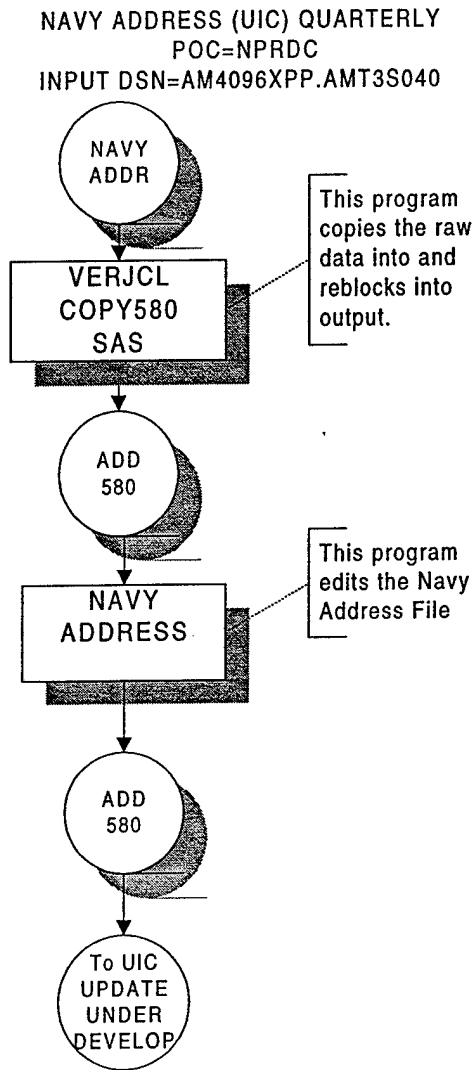
2.2.15   Ports of Call

This data is received quarterly on magnetic cartridge from the Chief of Naval Operations (CNO) and contains data on Ports of Call for the Navy. The process is depicted in Figure 2-16. General information is listed below.

Originator:	CNO
Point of Contact:	RON MARSHALL
Extension:	202-433-8861
Category/DSN:	PORT80
Event Codes Created:	660, 661, 662

Step 1   Copy the input data set and reblock to PORT80 output dataset.

NHRC Dataset:	PORT80
COBOL PROGRAM:	PORTEDIT
CMS EXEC:	PORTEDIT
Output Dataset:	PORT80

Step 2   SAS analysis of raw data variables.

NHRC Dataset:	PORT80
SAS PROGRAM:	PORT80
CMS EXEC:	PORT80
Output Dataset:	REPORT

Step 3

NHRC Dataset:	PORT80
PROGRAM:	PORTSORT
CMS EXEC:	PORTEDIT
Output Dataset:	PORT80

Figure 2-16 PORTS OF CALL Processing Flow

DEATH QUARTERLY
POC=NMDSC
INPUT DSN=SC3DCM.DEATH.MAST

DEATH
93

VERJCL
COPY93
SAS

This program
copies the raw
data into and
reblocks into
output.

DEATH
93

SAS DEATH93

SAS
ANALYSIS

DEATHEDIT

This program
edits and
reformats
variables into a
common format.

DEATH
117

To SSN
VERIFY
Page 2
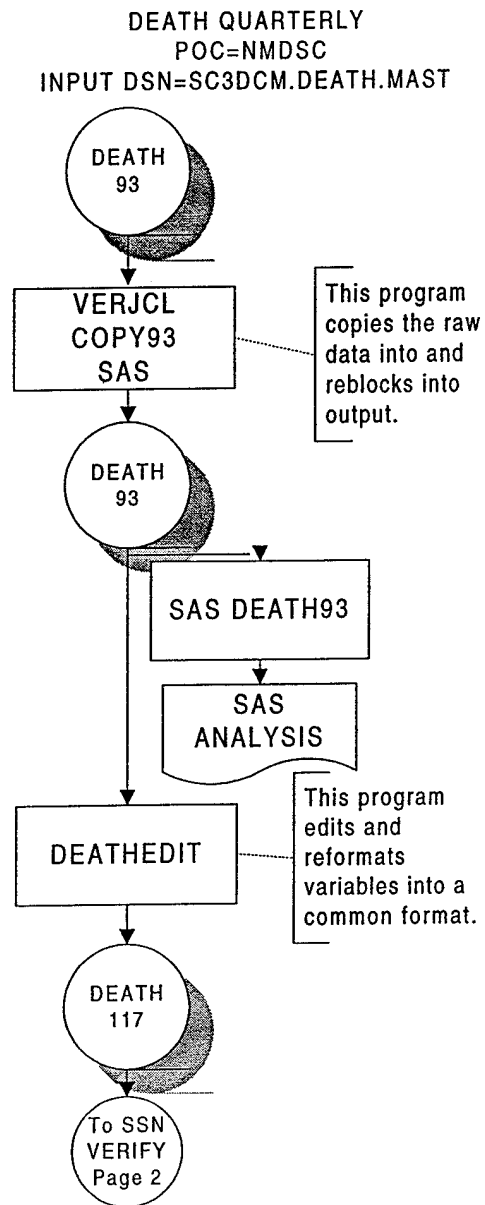
2.2.16   HIV46

This data is received as requested on magnetic cartridges from DMDC and NHRC contain data on Human Immunodefiency Virus (HIV) cases for the Navy and Marine Corps. The process is depicted in Figure 2-17. General information is listed below.

Originator:	DMDC
Point of Contact:	Betty Fong
Extension:	408-646-1010
Category/DSN:	DMDC46
Event Codes Created:	660-662

Step 1   **Copy the input data set and reblock to DMDC46 output dataset.**

NHRC Dataset:	DMDC46
COBOL PROGRAM:	CREATE46
CMS EXEC:	CREATE46
Output Datasets:	DMDCPOS, DMDC46 NEG

Step 2

NHRC Dataset:	DMDCPOS
COBOL PROGRAM:	MATCHPOS
CMS EXEC:	MATCHPOS
Output Dataset:	NEWDMDCPOS

Step 3

NHRC Datasets:	NHRC46POS,NHRC46NEG,CONTV7250,MTF46
COBOL PROGRAM:	DUPE46
CMS EXEC:	DUPE46
Output Dataset:	RDDB46,NHRC RDDB46

Step 4   **NHRC Datasets:**   RDDB46,RDDB MASTER

           COBOL PROGRAM: MATCH46

           CMS EXEC: MATCH46

           Output Dataset: DELETE46

Figure 2-17 HIVRDDB Processing Flow
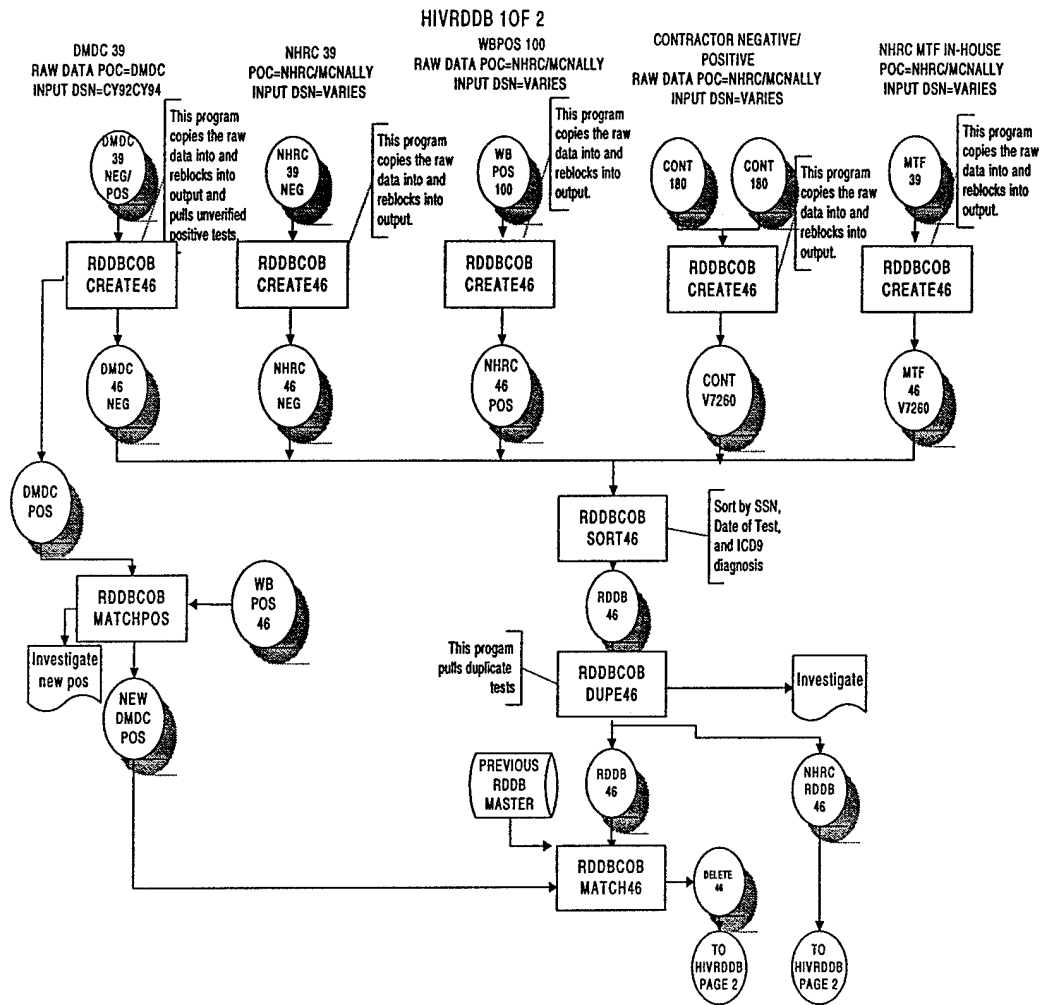
2.2.17   Social Security Number Verification

This data file is maintained at NHRC on disk with backup to cartridge. The personnel data from the preceding processes is used as input to update this data file. Common format personnel transactions are generated quarterly to maintain an active Social Security Number verification file. This verification file is utilized to validate personnel data (ie. SSN, date of birth, etc.) with medical transactions input to the system. Figures 2-18 through 2-20 summerize the flow of the verification system.

2.2.18   Service History File Maintenance

This data file is maintained at NHRC on disk with backup to cartridge. The medical and personnel data from the preceding processes is used as input to update this data file. Common format transactions from personnel and medical sources are input to update the master file. Figures 2-21 through 2-23 demonstrates the history update system flow.

2.2.19   Population Denominator Count File

The Population Denominator Count (PDC) file contains annual population counts for the entire enlisted population. The file is in a condensed format and is stored on disk to allow rapid access to Navy population data from 1974 to the present. Annual population counts are determined by summing five quarterly counts for each calendar year (31 December of the preceding year and 31 March, 30 June, 30 September, and 31 December of the year of interest) and dividing this sum by 5 to estimate the population at risk for the given year. Such denominators are needed for the calculation of disease incidence rates by age, sex, race, length of service, occupation, or combinations such as age-specific rates by occupation. The PDC file is derived from the Enlisted Master File (EMF) supplied by the Navy Military Personnel Command. The EMF contains personnel and service history data members. An extract is copied from the EMF quarterly and this

extract provides counts of Navy enlisted personnel broken down by the most frequently used demographic and service history variables and combinations of these. The variables represented in the PDC file and their categories are as follows:

- Age   17 through 60 by single years, 61 and over grouped

- Race   Caucasian, Black, oriental, American Indian, Malaysian, Not Recorded

- Sex   Male, female

- Paygrade   El through E9

- Education   <8 grouped, 9 through 20 by single years

- Length of service   1 through 30 by single years, 31 and over grouped

- Rate (occupation)   All Navy occupations, approximately 110

- Rate group   Eleven rate groups

- Activity   Six grouped activities

Specific population counts available from the Population Denominator Count (PDC) File are:

- Age-, race-, sex-specific counts by occupation or paygrade or length of service or education.

- Occupation-, race-, sex-specific counts by length of service or paygrade.

- Activity, race-, sex-specific counts by rate group, or paygrade, or length of service.

Quarterly or annual counts reflecting the specific subpopulations of interest are stored on disk and are immediately retrievable. An example of a frequently used combination would be age distributions within occupational specialties for male Caucasian members to compute age-specific hospitalization rates by occupation, sex, and race. other examples might be black Boiler Technicians aboard destroyers who have less than three years of service or female Hospital Corpsman who have some college education and are pay grade E-6 or above. This file can be used to determine number of individuals, or more commonly, person-years at risk during a specified time period.

Figure 2-18 SSN Verification Processing Flow (Chart 1)

SSN VERIFY 1 OF 3
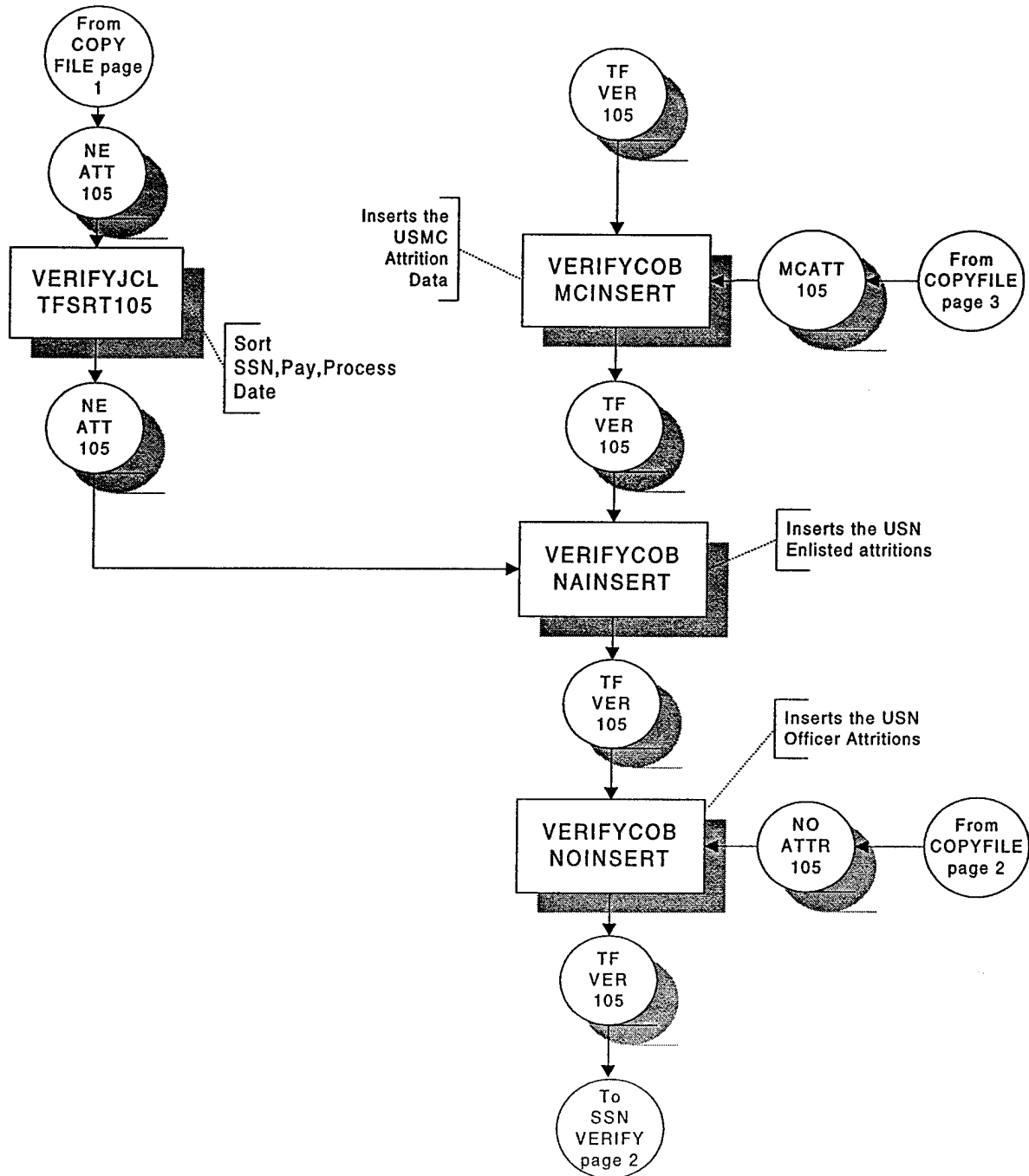
Figure 2-19 SSN Verification Processing Flow (Chart 2)

SSN VERIFY 2 OF 3

From SSN VERIFY page 1

TF VER 105

Inserts the USN Enlisted and Officer raw data

VERIFYJCL TFINSERT

PREV TFVER 105 MAST

From SSN VERIFY page 2

TF SRT 105

NR VER 105

From COPYFILE page 2

Inserts the USNR Officer Reserve Data

VERIFYCOB NRINSERT

NR VER 450

TF VER 105

This section of the system is under development

Inserts the PEB Board Data

VERIFYCOB PEINSERT

PEB 105

From COPYFILE page 4

TF VER 105

Final edits of Total Force Transactions

VERIFYCOB EDIT105

TF VER 105

To SSN VERIFY Page 1

To SSN VERIFY Page 3

To HIV RESEARCH Page 1

Figure 2-20 SSN Verification Processing Flow (Chart 3)

SSN VERIFY 3 OF 3

This section of the system is under development
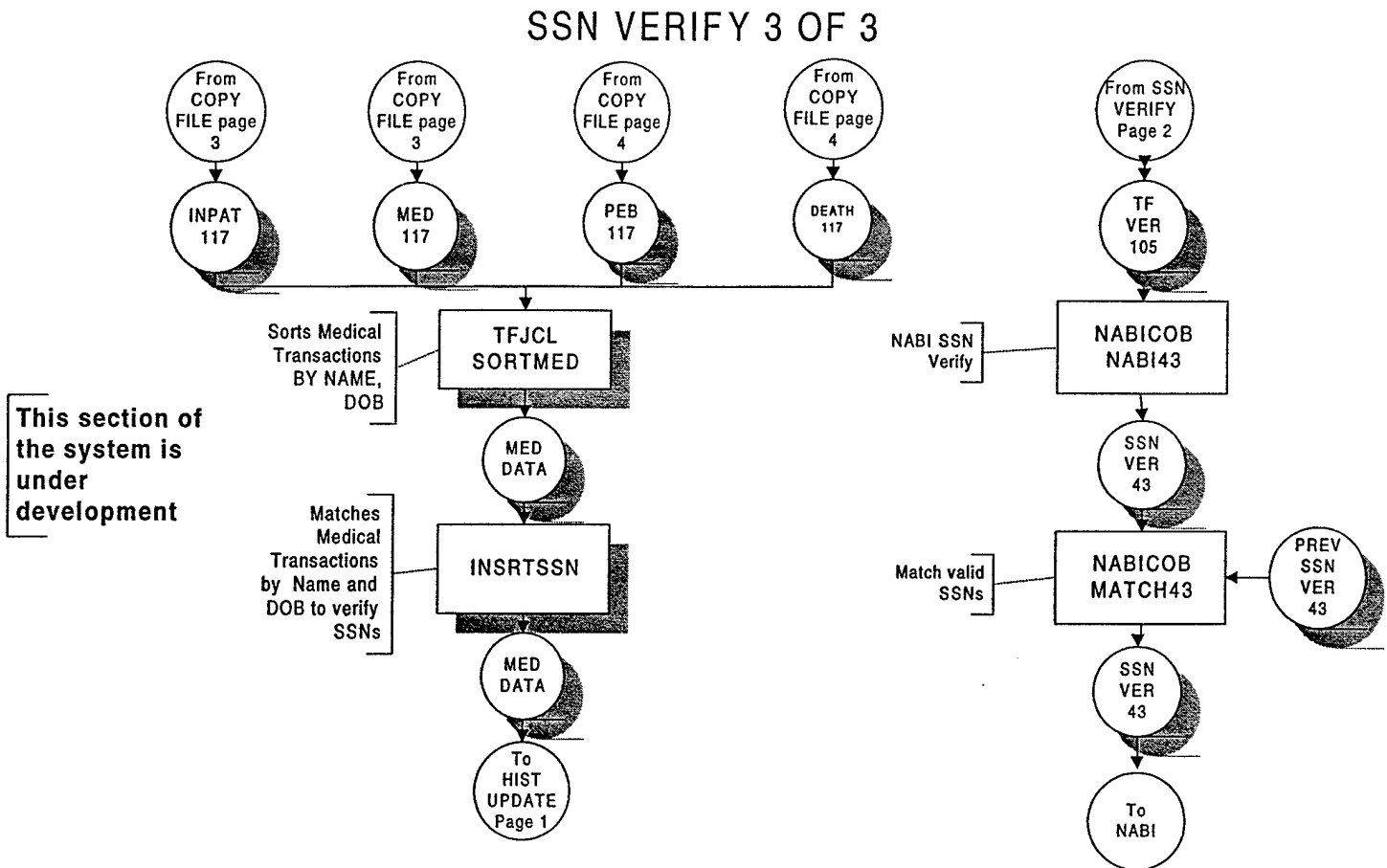
Figure 2-21 Update Processing Flow (Chart 1)

HISTORY UPDATE 1 OF 3
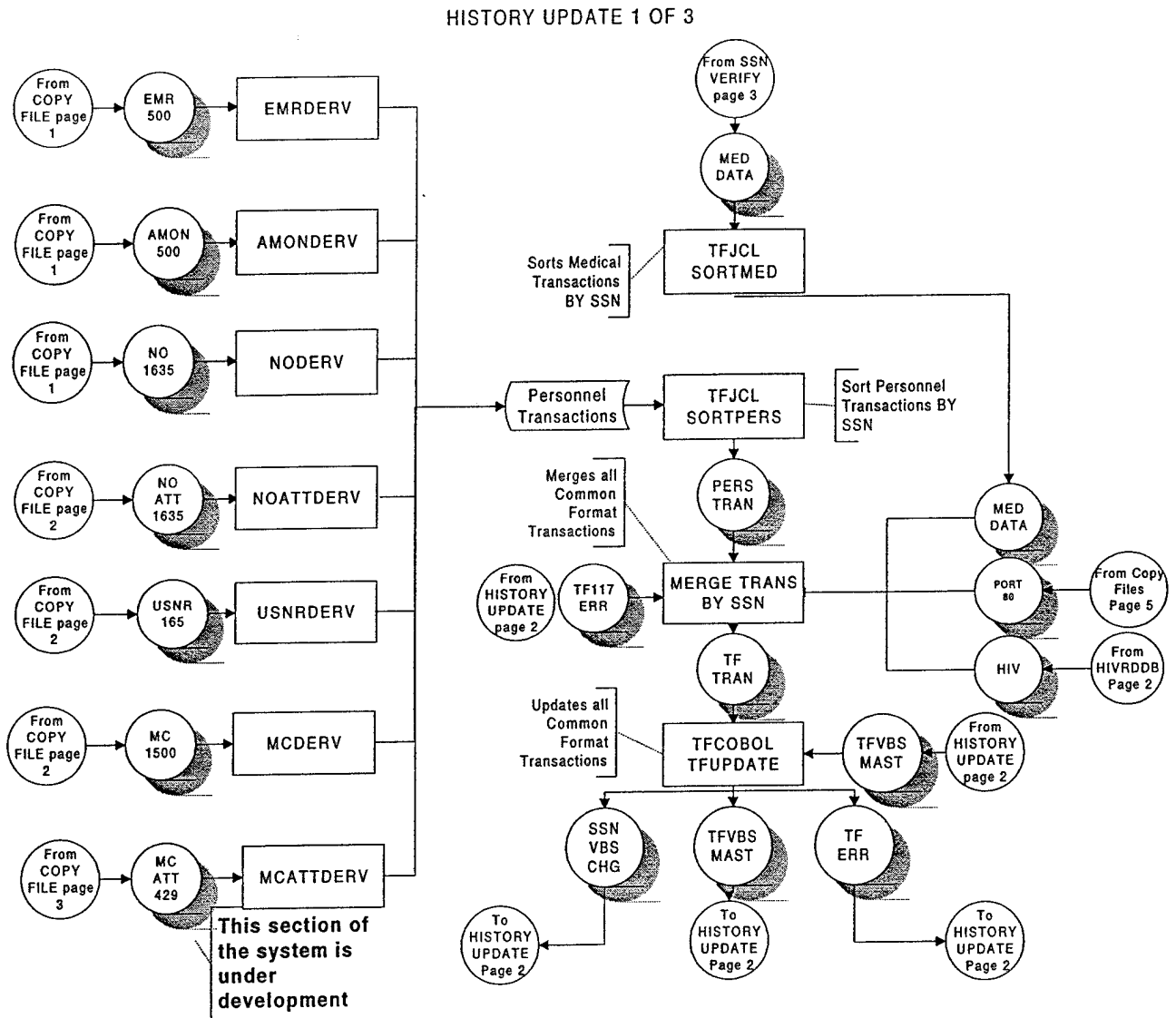
Figure 2-22 Update Processing Flow (Chart 2)

HISTORY UPDATE 2 OF 3
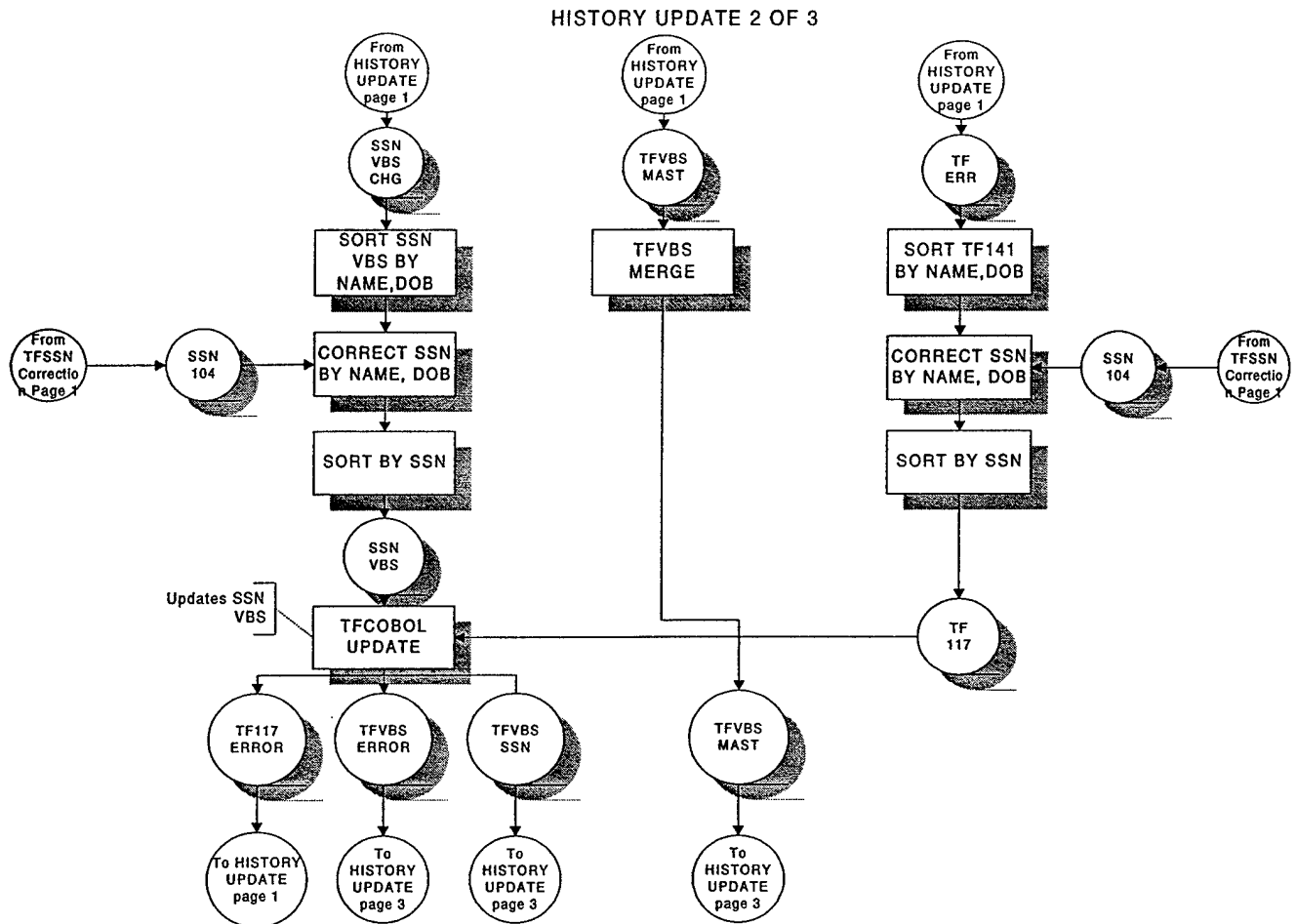
Figure 2-23 Update Processing Flow (Chart 3)

HISTORY UPDATE 3 OF 3
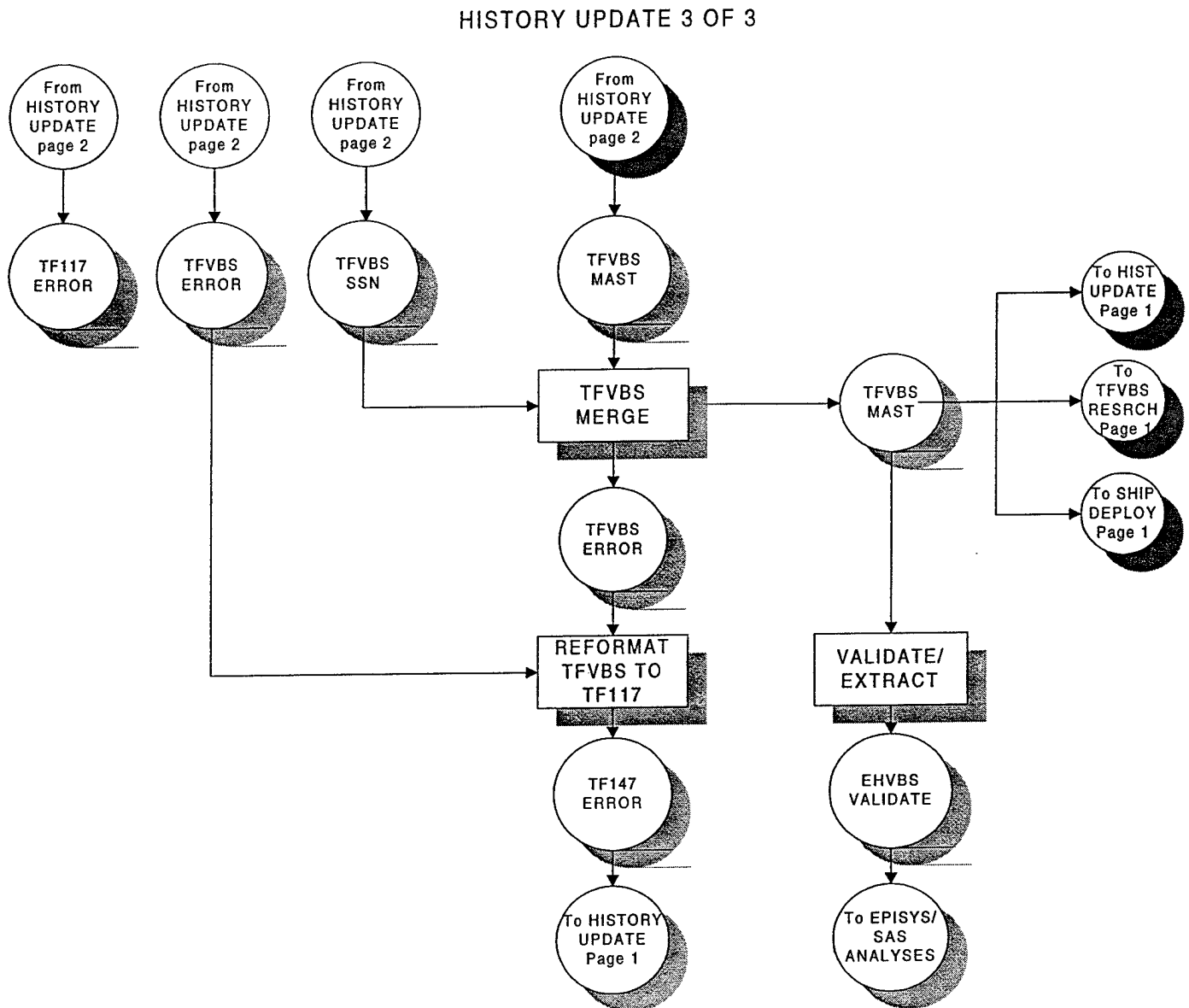
2.2.20 Accuracy and Validity

The logical accuracy and validity of data entering the CHAMPION system is accomplished via automated or manual processes, as detailed below:

a.   CHAMPION Update Process.   Updating of the Champions database is accomplished quarterly.   To ensure accuracy and validity of the data for the updates specific validation and verifications are performed.   Among these are the following:

- Machine edits and validations are performed automatically by the system upon entry of all data by verifying data against on-line edit tables, bypassing invalid data before update of system records.

- Control features have been developed to ensure that all related records remain in balance with each other and that each transaction updates all required records.

- Document control procedures have been developed to ensure that all input was, in fact, processed and that hard copy documentation is available for audit purposes.

b.   Daily Scheduled Output.   Daily CHAMPION products are available to users as required.

c.   Daily Nonscheduled Output.   Nonscheduled CHAMPION products based on terminal operators' requests are accepted on demand; however, delivery may be delayed depending on system usage and product size.

2.3 FLEXIBILITY

Due to the current size of the database and the existing quantity of programs developed to support and maintain the database, CHAMPION is not readily subject to change without a major design and development effort.

2.3.1 Capacity Limits

The International Business Machines (IBM) 4381 mainframe system used to process CHAMPION has capacity limited only by number and size of attached disk drives. Currently, there are 3380 disk drives available that have a total combined capacity of 27 gigabytes of storage.

The capacity required for CHAMPION increases by the execution of each update. The updates add new personnel and new rate change, transfer, and hospitalization event records. Since this is a historical database, records are not deleted. On-line storage must be sufficient for TBD CHAMPION records and associated sub-records

2.4 FALLBACK

Fallback is defined as the procedures necessary to ensure continuity of operation when all backup systems have failed. At the local site, fallback is accomplished by reloading CHAMPION databases and software onto an IBM mainframe from system backup tapes.

In the case of a catastrophic event at the NHRC, such as a flood or fire, the CHAMPION system will not come to a crashing halt. Sufficient back-up files and procedures are in place to minimize the risk of catastrophic events.

2.5   FAILURE CONTINGENCIES

Failure contingencies for CHAMPION are developed to include the restoration of programs and data on IBM type mainframe system.

SECTION 3

ENVIRONMENT

3.1 AIS EQUIPMENT ENVIRONMENT

Located in building 330 is a dual processor IBM 4381 model P92E mainframe computer which has tape, cartridge, and disk drive storage. The internal storage of the computer is 32 megabytes running the VM/SP operating system.

3.2 COMMUNICATIONS ENVIRONMENT

The data communications environment of the system is shown below in Figure 3.1. The primary means of linking is via dial-up modems from Personal Computer (PC) workstations. The connection is presently 14.4 Kbps modems to either the IBM 4381 or the Digital Equipment Corporation (DEC) AXP2100 which are linked via the Defense Data Network (DDN).

Figure 3-1 Data Communications Environment

THE CHAMPIONS RESEARCH DATABASE NETWORK
Career History Analytical Medical and Physical Information Open Network System
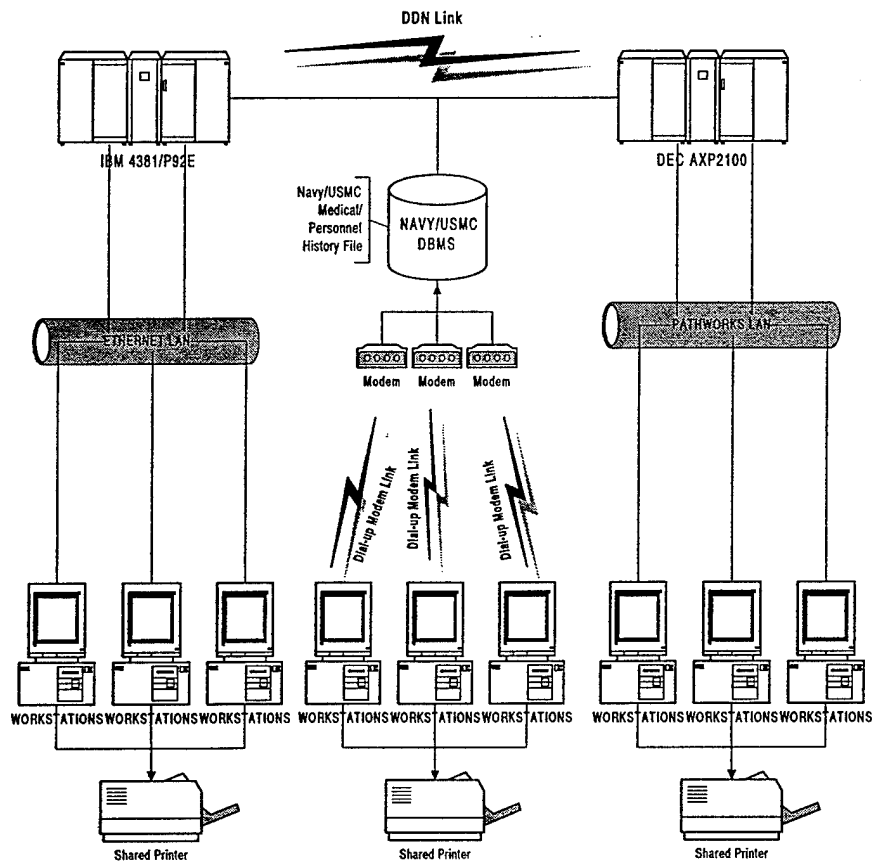
3.2.1   Network Description

The DEC Platform utilizes Pathworks Protocol for its LAN connectivity. External connections are made via DDN and the Internet. The purpose of the network is to facilitate access to all internal and external users via local area and wide area networks. Interfaces are described in the following:

a. Mainframe computers are connected via DDN to each other, while modem and local area network are used to connect to workstations and terminals as shown above.

b. The configuration utilizes dial-up and dedicated connections. The local area network is generally ethernet bus using Pathworks protocol.

c. Transmission technique is baseband on the local area networks and broadband for the wide area network.

d. Data transfer rates are limited by the modem speed for the dial-up users. The local area network users' transfer rate is ten megabits per second on the ethernet.

e. The gateway to the outside is via widearea network DDN and the Internet.

f. Geographic locations are generally on the West Coast with connectivity on DDN throughout the world.

g. The CHAMPION system uses the dial-up, local area, and wide area networks generally during business hours.

3.2.2   Physical Interface

The physical interface of the communications portion of the CHAMPION System is described below:

a. Line speed capability for the dial-up users is 14.4 Kbps. The dedicated local area network users run at ten megabits per second.

b. The electrical interface on the workstations is through standard RS232.

c. Hardware requirements are minimal. Dial-up links are achieved with modem and switched line interface. The dedicated local area network links are via standard ethernet hardware. Mainframe network hardware uses telecommunications controllers.

d. Transmission requirements are through high-speed lines both switched and dedicated.

3.2.3   Protocol Interface

The protocol interface is Pathworks for the DEC local area network. The wide area network protocol is Transmission Control Protocol/Internetwork Protocol (TCP/IP) on the DDN.

3.2.4   Applications User Interface

The application runs on the IBM mainframe. The primary interface to users is via dial-up modems and local area networks. There is also a DDN link to the outside wide area network.

3.2.5   Diagnostics

Users can identify communications problems through a customer support specialist. Diagnostic tools are available to the specialist to quickly pinpoint the source of the problem. Field service personnel are on-call when the problem is not resolved within a reasonable period.

3.3   SUPPORT SOFTWARE ENVIRONMENT

The operating system used on the AIS is IBM's Virtual Machine (VM) with Conversational Mode System (CMS). All programs are maintained in disk libraries using CMS. The programs are compiled with COBOL and executed using the CMS EXEC.

3.4   SOFTWARE INTERFACES

The software interfaces are primarily COBOL and SAS programs. The customized statistical package, *EPISYS*, resides on a personal computer and is written in C++. The database files are extracted and downloaded to the PC for analysis.

EPISYS is an acronym for the Navy's prototype Epidemiological Projection Interactive System. *EPISYS* is a PC-based, user-friendly interface system that calculates person-year-based first hospitalization rates from data available in the *Enlisted History*. *EPISYS* contains arrays of counts of cases and population denominators, rather than entire individual records. This allows a user of *EPISYS* to rapidly access incidence data, perform age-adjustment, and display trends for all ICD-9 categories. Currently, *EPISYS* produces counts and incidence rates for Navy enlisted personnel only. Drawing on a common data architecture, it could be expanded to include Navy officers, Marine Corps personnel, and it could be used by other services. It is designed to run on standard IBM

486 PC equipment under a DOS/WINDOWS environment, and has user-friendly menus for selection of variables and tabular and graphical displays.

Preliminary assessment of data resource availability and file structures indicate that inclusion of Navy Officers and Marine Corps personnel into the *Enlisted History* could be accomplished during the time frame of this project. Preliminary assessment indicates that the *Enlisted History* format with a variable length record data architecture can be adapted for use by other services, subject to the availability of data resources. Using the *Enlisted History* data architecture as a prototype, each service could develop hospitalization and other health event rate analyses using its own data.

The current front-end statistical analysis system can have some differences when comparing frequency counts. When *EPISYS* is run on the PC using *Enlisted History* Validation file, it counts the first (primary) diagnosis (601 record) for all hospitalizations. (For example: if a person has three hospitalizations with the same primary diagnosis, then the frequency count would be three). A SAS analysis on the *Enlisted History* file may not only count the *first* diagnosis for a hospitalization, but also secondary diagnoses as well, including Medical and Physical Evaluation Board rulings.

3.5   SECURITY

The IBM mainframe that hosts the application utilizes standard VM/CMS protection of data and user IDs.

SECTION 4

DESIGN DETAILS

4.1   GENERAL OPERATING PROCEDURES

This paragraph describes the operating procedures for CHAMPION and will include some of the following paragraphs. The standard operation schedule is run as a batch process quarterly depending on the arrival of input sources. The input normally arrives on tape cartridge and is copied for backup. Raw input data is analyzed with SAS procedures prior to processing. Database extracts and reports are normally performed on an adhoc basis. The database is backed up quarterly.

4.2   SYSTEM LOGICAL FLOW

This section describes the general framework and design for the CHAMPION system. It provides a generic discussion of a typical processing module and follows the flow of a transaction from the users initial input to produced output.

4.2.1   Major Components

a. Overall. VM/CMS is used for access to the system and for overall processing control, such as job submission and execution.

4.3   SYSTEM DATA

This paragraph describes inputs, outputs and databases of the system. Record descriptions and data element descriptions are described in detail in the CHAMPION Data Requirements Document.

4.3.1   Inputs

The data used as input from external sources are listed here.

4.3.1.1   EMR500 Quarterly Navy Enlisted. The file is received quarterly on cartridge from NPRDC and processed through the update process. The file and record layouts are shown in Appendix B of the Data Requirements Document (DRD) with data elements listed in Appendix C of the DRD.

4.3.1.2   AMON500 Monthly Navy Enlisted Attrition and Accession. The file is also received quarterly on cartridge from NPRDC and processed through the update process. The file and record layouts are shown in Appendix B of the Data Requirements Document (DRD) with data elements listed in Appendix C of the DRD.

4.3.1.3   NO1635 Navy Officer. Strength file, active duty. The file is received quarterly on cartridge from DISA and processed through the update process. The file and record layouts are shown in Appendix B of the Data Requirements Document (DRD) with data elements listed in Appendix C of the DRD.

4.3.1.4   NO1635 Navy Officer. Accession, attrition, and discharge personnel file. The file is received quarterly on cartridge from NPRDC and processed through the update process. The file and record layouts are shown in Appendix B of the Data Requirements Document (DRD) with data elements listed in Appendix C of the DRD.

4.3.1.5   INRP Navy Reserve. USNR165 comes from Naval Reserve Command, New Orleans and USNR450 comes from Defense Manpower Data Center, Monterey, CA. The file is received quarterly on cartridge and processed through the update process. The file

and record layouts are shown in Appendix B of the Data Requirements Document (DRD) with data elements listed in Appendix C of the DRD.

4.3.1.6   HMF9503 Marine Corps Enlisted and Officer. The file is received quarterly on cartridge from NPRDC and processed through the update process. The file and record layouts are shown in Appendix B of the Data Requirements Document (DRD) with data elements listed in Appendix C of the DRD.

4.3.1.7   USMC429 Marine Corps Attrition Enlisted and Officer. The file is received quarterly on cartridge from NPRDC and processed through the update process. The file and record layouts are shown in Appendix B of the Data Requirements Document (DRD) with data elements listed in Appendix C of the DRD.

4.3.1.8   INPAT504 Inpatient. The file is received quarterly on cartridge from NMIMC and processed through the update process. The file and record layouts are shown in Appendix B of the Data Requirements Document (DRD) with data elements listed in Appendix C of the DRD.

4.3.1.9   MED300 MED Board. The file is received quarterly on cartridge from NMIMC and processed through the update process. The file and record layouts are shown in Appendix B of the Data Requirements Document (DRD) with data elements listed in Appendix C of the DRD.

4.3.1.10   PEB - Physical Evaluation Board. The file is received quarterly on cartridge from NMIMC and processed through the update process. Under the new Medical Board tracking system, Physical Evaluation Board (PEB) data will be integrated with the Med

Board data. The file and record layouts are shown in Appendix B of the Data Requirements Document (DRD) with data elements listed in Appendix C of the DRD.

4.3.1.11 <u>DEATH94 Death USMC/NAVY.</u> The file is received quarterly on cartridge from NMDSC and processed through the update process. The file and record layouts are shown in Appendix B of the Data Requirements Document (DRD) with data elements listed in Appendix C of the DRD.

4.3.1.12 <u>USMC Address (MCC/RUC).</u> The file is received quarterly on cartridge from NPRDC and processed through the update process. The file and record layouts are shown in Appendix B of the Data Requirements Document (DRD) with data elements listed in Appendix C of the DRD.

4.3.1.13 <u>ADD580 Navy Address (UIC).</u> The file is received quarterly on cartridge from NPRDC and processed through the update process. The file and record layouts are shown in Appendix B of the Data Requirements Document (DRD) with data elements listed in Appendix C of the DRD.

4.3.1.14 <u>Ports of Call.</u> The file is received quarterly on cartridge from NPRDC and processed through the update process. The file and record layouts are shown in Appendix B of the Data Requirements Document (DRD) with data elements listed in Appendix C of the DRD.

4.3.1.15 <u>DMDC39.</u> The file is received quarterly on cartridge from NPRDC and processed through the update process. The file and record layouts are shown in Appendix B of the Data Requirements Document (DRD) with data elements listed in Appendix C of the DRD.

4.3.2   Outputs

Outputs from CHAMPION consist of data extracts for use by research personnel. The extracts are created as required when requests for data are received from the researchers. The extracts are then analyzed using SAS routines by the researchers.

4.3.3   Database/Data Bank

Database descriptions are presented in the following paragraphs.

4.3.3.1   Service History File. This data file is maintained at NHRC on disk with backup to cartridge. The data from the preceding processes is used as input to update this data file. This file contains data collected from fleet and navy hospitals for inpatient hospitalizations. This includes data from medical boards, physical evaluation boards, and the official Navy death record system. Demographic data is also maintained via quarterly updates.

The Service History File, contains personnel and service history data on all enlisted Navy personnel who have served on active duty since January 1965. It is being modified to include data on Navy officer and Marine Corps officer/enlisted personnel. Additionally, the file is being mapped for use by the Army and Air Force. This file is updated from various files received from other organizations. These files are reformatted into a common record format which is then used to update the master Service History File. In addition, there are supporting data files which are used in conjunction with Service History File for research and analysis. One of these is the Population Denominator Count File. The following paragraphs describe the CHAMPION system and the processes used to update and maintain the data files.

4.3.3.2   Population Denominator Count File.   This file contains the official Navy/Marine Corps end strengths by quarter for both enlisted and officer.   These files will match the official Navy/United States Marine Corps (USMC) published personnel publications.

The Population Denominator Count (PDC) file contains annual population counts for the entire enlisted population. The file is in a condensed format and is stored on disk to allow rapid access to Navy population data from 1974 to the present. Annual population counts are determined by summing five quarterly counts for each calendar year (31 December of the preceding year and 31 March, 30 June, 30 September, and 31 December of the year of interest) and dividing this sum by 5 to estimate the population at risk for the given year. Such denominators are needed for the calculation of disease incidence rates by age, sex, race, length of service, occupation, or combinations such as age-specific rates by occupation. The PDC file is derived from the Enlisted Master File (EMF) supplied by the Navy Military Personnel Command. The EMF contains personnel and service history data members. An extract is copied from the EMF quarterly and this extract provides counts of Navy enlisted personnel broken down by the most frequently used demographic and service history variables and combinations of these.

Quarterly or annual counts reflecting the specific subpopulations of interest are stored on disk and are immediately retrievable. An example of a frequently used combination would be age distributions within occupational specialties for male Caucasian members to compute age-specific hospitalization rates by occupation, sex, and race. other examples might be black Boiler Technicians aboard destroyers who have less than three years of service or female Hospital Corpsman who have some college education and are pay grade E-6 or above. This file can be used to determine number of individuals, or more commonly, person-years at risk during a specified time period.

4.4 SOFTWARE UNIT DESCRIPTIONS

The following paragraphs describe the major functions of each program and its relationships with files and other programs. The information has been organized hierarchically to provide supporting detail for the diagrams of Section 2.

4.4.1 EMR500 Quarterly Navy Enlisted

The following programs provide users with the capability to copy and reformat the EMR500 input data: EMRCOPY and NEVER105. The input records are reformatted to a common record format to update the social security number verification master with demographic data. The input records are also reformatted to a common record format in EMRDERV for the TFUPDATE program.

4.4.2 AMON500 Monthly Navy Enlisted Attrition and Accession

The following programs provide users with the capability to copy and reformat the AMON500 input tape: AMONCOPY and NEATT105. The input records are reformatted to a common record format to update the social security number verification master with demographic data. The input records are also reformatted to a common record format in AMONDERV for the TFUPDATE program.

4.4.3 NO1635 Navy Officer

The following programs provide users with the capability to copy and reformat the NO1635 input tape: COPYFILE and NOATT105. The input records are reformatted to a common record format to update the social security number verification master with demographic data.. Under development, the input records will also be reformatted to a common record format in NODERV for the TFUPDATE program.

4.4.4   NOATTR1635 Navy Officer

The following programs provide users with the capability to copy and reformat the NOATTR1635 input tape: COPY1635 and NOATT195.   The input records are reformatted to a common record format to update the social security number verification master with demographic data.   Under development, the input records will also be reformatted to a common record format in NOATTRDERV for the TFUPDATE program.

4.4.5   USNR Navy Reserve

The following programs provide users with the capability to copy and reformat the USNR165 input tape: COPY165 and NEVER105.   The input records are reformatted to a common record format to update the social security number verification master with demographic data.   Under development, the input records will also be reformatted to a common record format in USNRDERV for the TFUPDATE program.

4.4.6   HMF9503 Marine Corps Raw Data

The following programs provide users with the capability to copy and reformat the HMF9503 input tape: COPY1500 and MCVSEP94.   The input records are reformatted to a common record format to update the social security number verification master with demographic data.   Under development, the input records will also be reformatted to a common record format in MCDERV for the TFUPDATE program.

4.4.7   USMC429 Marine Corps Enlisted and Officer Attrition

The following programs provide users with the capability to copy and reformat the USMC429 input tape: COPY429 and MCADEC92.   The input records are reformatted to a common record format to update the social security number verification master with demographic data.   Under development, the input records will also be

reformatted to a common record format in MCATTDERV for the TFUPDATE program.

4.4.8   INPAT504 Inpatient

The following programs provide users with the capability to copy and reformat the INPAT504 input tape: COPY504 and DERV504. The input records are reformatted to a common record format for input to the verify demographic data prior to the TFUPDATE program.

4.4.9   MED300 MED Board

The following programs provide users with the capability to copy and reformat the MED300 input tape: COPY300 and MEDEDIT. The input records are reformatted to a common record format for input to the verify demographic data prior to the TFUPDATE program.

4.4.10   PEB105 Physical Evaluation Board

The following programs provide users with the capability to copy and reformat the PEB105 input tape: COPY105 and PEBEDIT. Under the new Medical Board tracking system, Physical Evaluation Board (PEB) data will be integrated with the Med Board data. The input records are reformatted to a common record format for input to the verify demographic data prior to the TFUPDATE program.

4.4.11   DEATH93 Death USMC/NAVY

The following programs provide users with the capability to copy and reformat the DEATH93 input tape: COPY93 and DEATHEDIT. The input records are reformatted to a common record format for input to the verify demographic data prior to the TFUPDATE program.

4.4.12   USMC Address (MCC/RUC)

The following programs provide users with the capability to copy and reformat the MCADDR input tape: COPYFILE and USMCADDR. This data is received quarterly on magnetic cartridge from NPRDC and contains data on UIC addresses for the Marine Corps.

4.4.13   ADD580 Navy Address (UIC)

The following programs provide users with the capability to copy and reformat the ADD580 input tape: COPYFILE and USMCADDR. This data is received quarterly on magnetic cartridge from NPRDC and contains data on UIC addresses for the Navy.

4.4.14   Ports of Call

The following programs provide users with the capability to copy and reformat the PORT80 input tape: PORT80 and PORTSORT. This data is received quarterly on magnetic cartridge from the CNO and contains data on ship deployments. The input records are copied for input to TFUPDATE program.

4.4.15   DMDC39

The following programs provide users with the capability to copy and reformat the input tape: CREATE46, DUPE46, and MATCH46. This data is received quarterly on magnetic cartridge from DMDC and contains data on RDDB tests.

4.4.16   Service History File

This data file is maintained at NHRC on disk with backup to cartridge. The data from the preceding processes is used as input to update this data file. The file is updated quarterly with the TFUPDATE program.

4.4.17 Population Denominator Count File

This file contains the official Navy/Marine Corps strengths by quarter. This includes enlisted and officer end strengths. This file will match the official Navy/USMC published personnel publications.

APPENDIX E

EPISYS MANUAL

USER GUIDE

and

TECHNICAL REFERENCE

EPISYS

Epidemiological Projection Interactive System

Naval Health Research Center

Medical Information Systems and Operations Research Department

Written by Dr. Ivan T. Show
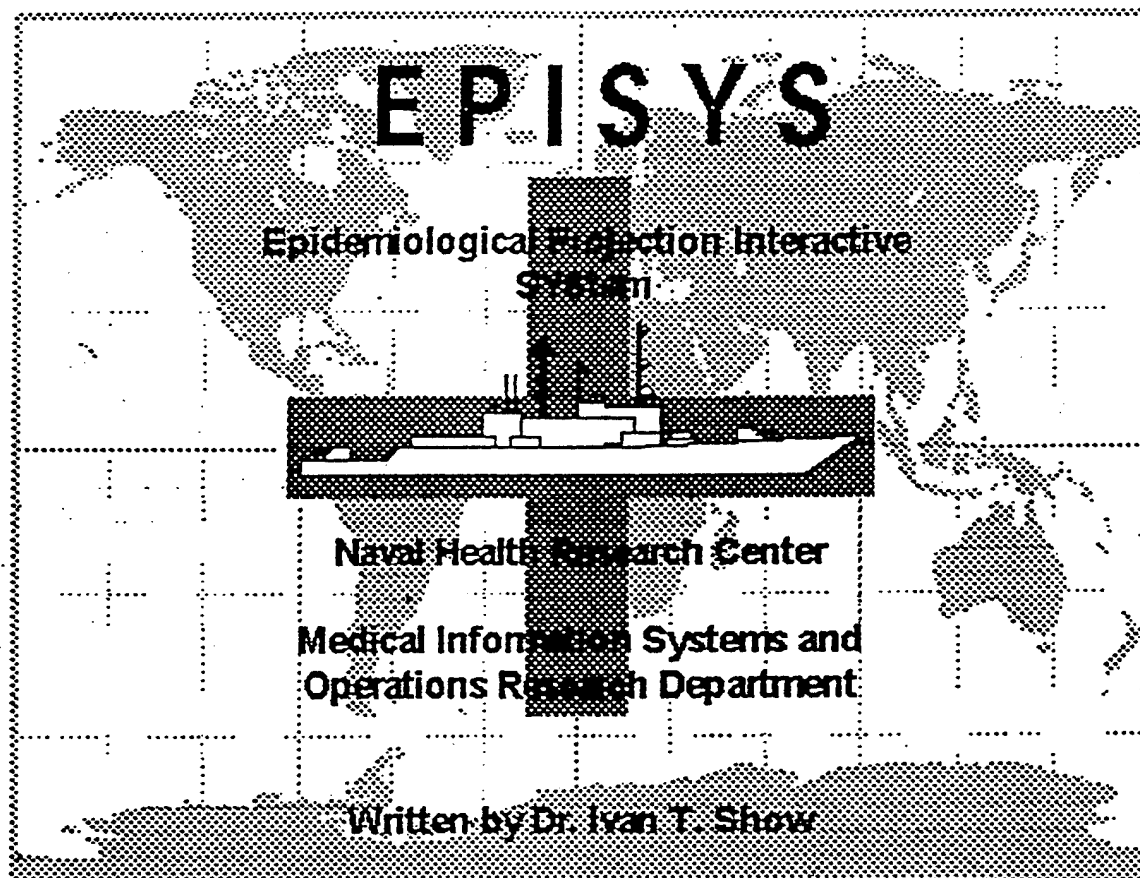
30 SEPTEMBER 1993

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 Overview

EPISYS is an acronym for Epidemiological Projection Interactive System. EPISYS has been developed over the last five years by Dr. Ivan T. Show of Southwest Research Associates, Inc. (SRA) in conjunction with the Naval Health Research Center, San Diego, Ca (NHRC).

The purpose of EPISYS is to to rapidly access, analyze, and summarize large amounts of epidemiological data. To this purpose, data from various sources is organized into a single standardized file called the Common Data Format (CDF) file. As of 30 September 1993, the CDF contains over 481,000 in-patient records covering the time period from 1 January 1980 through 31 December 1988. Within the next few months, the CDF will be expanded to approximately 640,000 records covering the time period from 1 January 1980 through 31 December 1992. The current CDF is limited to treatment records for US Navy enlisted personnel. Each record includes the following items:

o patient information:
   o sex
   o age
   o service branch - USN/USMC
   o grade - officer/enlisted
   o occupation rate
   o duty platform - ashore/ship type
   o ocean reporting region
   o duty UIC
   o social security number

o treatment information:
   o treatment date
   o treatment UIC
   o visit sequence number
   o code indicating return to duty
   o NHRC diagnosis/classification code

Note: Full information is not yet available on duty platforms and ocean reporting regions.

EPISYS handles both frequencies and incidence rates. Incident rate calculations are supported by the Denominator Data File (DDF). The DDF contains "total person-days at risk" cross-classified by sex, age, branch, grade, occupation rate, duty platform and ocean region. The DDF also supports the calculation of age-adjusted and standardized incidence rates.

EPISYS runs very quickly. Ongoing research has shown the system capable of producing a complete analysis in as little as five minutes. Very complex analyses are usually completed in less than one hour. EPISYS is simple to use and relatively self-explanatory.

1

1.2 Hardware Requirements

EPISYS is designed to run on standard IBM PC equipment. The following is required:

o computer :   IBM PC or fully compatible
o processor: 80486DX-33MHz (80386/80387 not recommended)
o RAM: at least 4 megabytes configured as Extended Memory
o disk drive: at least 120 megabyte hard drive and 3.25" floppy
o tape: internal streaming recommended
o video: Tseng-4000 or later with VESA super-VGA compatibility
o monitor: analog, super-VGA compatible
o printer: LQ1500 or Post-Script compatible recommended
o mouse: IBM compatible (serial port or bus)

The processor must have the minimum capabilities of the 80486DX; any 80486 with greater capability is acceptable. Minimum processor speed for efficiency is 33 MHz although a faster processor can be used. It is possible to use an 80386 based computer; however, it is not recommended. If an 80386 based computer is used, it MUST have an 80387 math coprocessor installed.

EPISYS makes extensive use of super-VGA graphics and is very sensitive to video capabilities. Therefore, it is absolutely essential that a video board be installed that is based on the Tseng 4000 video driver. The board must also have VESA super-VGA capability. Video board and monitor must be capable of displaying 1024x768 resolution and 256K colors.

1.3 Software Requirements

EPISYS runs under DOS 6.0 and WINDOWS 3.1 and uses capabilities unique to these operating systems. Unpredictable results occur if earlier versions of DOS or WINDOWS are used. It is strongly recommended that the DOS DBLSPACE utility NOT be used. DBLSPACE (a disk file compression utility) that can lead to serious problems if a large proportion of the hard disk capacity is used.

AUTOEXEC.BAT and CONFIG.SYS should be configured as shown below, then the DOS MEMMAKER utility run to optimize memory allocation. After MEMMAKER is done, run MEM and observe "Largest executable program size (second line from the bottom); this number must be at least 615K for all EPISYS modules to execute properly. In the following, assume that EPISYS has been placed in the subdirectory C:\EPISYS.

```
AUTOEXEC.BAT:   PATH (add C:\EPISYS and C:\WINDOWS)
                LH   SMARTDRV 2048
                LH   MOUSE.COM
                LH   DPMIMEM=maxmem 2048
                SET  TEMP = C:\WINDOWS\TEMP
```

* NOTE: MEMMAKER might modify the SMARTDRV and MOUSE commands.

2

```
CONFIG.SYS:     DEVICE = HIMEM.SYS
                DEVICE = EMM386.EXE NOEMS HIGHSCAN *
                DOS     = UMB
                DOS     = HIGH
                DEVICEHIGH ANSI.SYS *
                LASTDRIVE = C (highest drive letter)
                BUFFER = 20,0
                FILES  = 40
                FCBS   = 1,0
                BREAK  = ON
                STACKS = 9,256
```

* NOTE: MEMMAKER might modify the EMM386 and ANSI.SYS commands.

DOS 6.0 uses a menu system for variable AUTOEXEC.BAT and CONFIG.SYS configurations. If the computer has programs requiring different configurations, it might be necessary to incorporate multiple boot options in the AUTOEXEC.BAT and CONFIG.SYS files in order to successfully run EPISYS.

1.4 Installation

EPISYS executable modules and essential support files are on four 3.25" floppy disks. The CDF and DDF files are on a variable number of 3.25" floppy disks. Foa a complete installation, executable modules and CDF and DDF files must be placed on the hard drive.

TO INSTALL EPISYS EXECUTABLE MODULES:

1. Make directory: C:\EPISYS.

2. Go to directory: C:\EPISYS.

3. Place "EPISYS DISK 1" in 3.25" drive (assume A:).

4. Run: A:INSTALL.

5. Repeat steps 3 and 4 for "EPISYS DISK 2" through "EPISYS DISK 4".

TO INSTALL CDF AND DDF FILES:

1. Go to directory: C:\EPISYS.

2. Run: LOADCDF.

3. Follow the instructions on the screen. Switch floppy disks when instructed to do so.

1.5 Startup

Before attempting to run EPISYS, make sure that all steps described in sections 1.3 and 1.4 have been completed and that the computer has been booted under the proper configuration.

TO START EPISYS:

1. Go to directory: C:\EPISYS.

2. Run: GOEPISYS.

   WINDOWS loads and and the EPISYS Logo screen appears.

3. Press <ENTER>.

   The EPISYS Desktop appears.

4. Click the "Maximize Button" (upper right corner of screen). EPISYS is loaded and ready to run.

1.6 Using Menus

All menus operate according to the Microsoft SAA/CUA standard for Graphic User Interfaces. This means that they operate identically to menu systems in literally all other WINDOWS applications. A user familiar with any WINDOWS application can therefore easily operate EPISYS. The EPISYS menus are part of the EPISYS Desktop (see section 2.1 for further details).

TO OPERATE EPISYS MENUS:

1. Click on main menu item.

   Drop-down menu appears.

2. Click on drop-down menu item.

   Dialog appears. When the operation is complete, system returns to EPISYS Desktop.

3. If wrong main menu item selected:

   3a. Click on correct main menu item from anywhere in drop-down menus. New drop-down menu appears.

   3b. Click on any blank portion of EPISYS Desktop. Drop-down menu disappears.

4

1.7 Using Dialog Controls

All dialogs operate according to the Microsoft SAA/CUA standard for Graphic User Interface. This means that they operate identically to dialogs in literally all other WINDOWS applications. See sections 4.0, 5.0, and 6.0 for details on all EPISYS dialogs.

TO ENTER VALUES IN TEXT/NUMERICAL INPUT FIELDS:

1. Desired field not active:

   1a. Press <TAB> or <SHIFT-TAB>. Highlight appears and moves.

   1b. Click anywhere in desired field. Editing cursor appears.

2. Active field highlighted:

   2a. To replace old value, immediately type new value. Previous value is automatically erased. <DEL> also erases out value.

   2b. To edit old value, press <HOME> or <ARROW> key. Highlight disappears and editing cursor appears.

3. Editing cursor in active field:

   3a. Press <DEL> or <BACKSPACE> to erase parts of old value.

   3b. Type new value.

   3c. Press <INS> to toggle between Insert and Typeover mode.

   3d. Press <TAB> or click in another field to exit field and accept value.

4. If value entered out of range, warning message appears. Click "OK" or press <RETURN>, then reenter value.

TO PICK AN ITEM FROM SELECTION LIST:

1. Single selection list:

   1a. To select, click on item. Selected item is highlighted.

   1b. To de-select, click on any other item. Highlight disappears.

2. Multiple selection list:

   2a. To select, click on each desired item. Selected items are highlighted.

   2b. To de-select, click on highlighted items. Highlights disappear.

5

3. More items than will fit in list box:

    3a. Scroll bar appears.

    3b. To scroll up or down one item, click top or bottom button.

    3c. To scroll up or down one page, click scroll bar above or below position marker.

TO PICK AN ITEM FROM OPTION LIST:

1. Operates as standard Radio Button List.

    1a. Only one option may be selected from list.

    1b. Button to left of selected option is highlighted.

    1c. One option is always selected.

2. To select, click button or click on item description.

TO ACTIVATE CONTROL OPTION:

1. Operates as standard Push Button.

    1a. Initiates immediate system action.

    1b. Default or active option has its label highlighted.

2. To activate default or active option, click option or press <RETURN>.

3. To activate non-active option, click option.

MEANING OF SPECIFIC CONTROL OPTIONS:

1. OK: Accept everything in dialog and return to previous level.

2. CONTINUE: Execute current dialog selections.

3. CANCEL: Reject changes in dialog or abort execution of dialog selections. Return to dialog or previous level.

4. DONE: Dialog selections complete. Return to previous level.

5. ACCEPT: Reset dialog to reflect changes.

6. REJECT: Reset dialog to previous state.

6

2.0 MAIN OPTIONS

2.1 Desktop

The EPISYS Desktop contains five options. These options are the main menu items used to control the system. Each main menu item has a submenu. Menus and sub-menus are described in section 1.4. Figure 1 shows the EPISYS desktop menu structure. Each menu item is discussed in subsequent sections.

```
┌──────────────────────────────────────────────────────────────┐
│  ┌────────────────────────────────────────────────────────┐  │
│  │  EPIDEMIOLOGICAL PROJECTION INTERACTIVE SYTSTEM        │  │
│  ├────────────────────────────────────────────────────────┤  │
│  │  Episys   Multivariate   Univariate   Limits   Quit    │  │
│  └────────────────────────────────────────────────────────┘  │
│                                                                │
│  ┌──────────────────────────┐   ┌─────────────────────────┐  │
│  │  About EpiSys             │   │  Perform Analysis       │  │
│  │  Run EpiSys Preparation   │   │  Review Results         │  │
│  └──────────────────────────┘   └─────────────────────────┘  │
│                                                                │
│       ┌──────────────────────────────────┐                    │
│       │  Select Multivariate Options      │                    │
│       │  Define Data Structure            │                    │
│       ├──────────────────────────────────┤                    │
│       │  Extract Data                     │                    │
│       │  Review Extraction                │                    │
│       ├──────────────────────────────────┤                    │
│       │  Perform Analysis                 │                    │
│       │  Review Analysis                  │                    │
│       └──────────────────────────────────┘                    │
│                                                                │
│          ┌──────────────────────────────────┐                 │
│          │  Select Univariate Options        │                 │
│          │  Define Data Structure            │                 │
│          ├──────────────────────────────────┤                 │
│          │  Extract Data                     │                 │
│          │  Review Extraction                │                 │
│          ├──────────────────────────────────┤                 │
│          │  Select Data Structure            │                 │
│          │  Calculate Data Summary           │                 │
│          └──────────────────────────────────┘                 │
└──────────────────────────────────────────────────────────────┘
```

Figure 1. EPISYS Desktop and Menu Options.

7

2.2 Menus

Each main menu item (except QUIT) selects a major EPISYS module. The following defines the purpose of each module:

Episys:
: System initialization on first-time start and displays EPISYS logo screen. In a future update, this will be the entry point into the help system.

Multivariate:
: Analysis of multiple simultaneous dependent variables: NHRC codes and month-of-the-year. NHRC codes may be individual 5-digit NHRC codes, one of 29 major NHRC categories, or one of 130 minor NHRC categories (see the Technical Reference for definitions of major and minor categories). Independent ancillary variables are analyzed for their effects on the dependent variables; these include sex, race, age, branch, grade, occupation, platform and ocean region. Sampling stratification and size allocation is also included.

Univariate:
: Analysis of single dependent NHRC codes or major or minor NHRC categories. Frequencies and rates are calculated as well as age-adjusted and standardized rate summaries. Raw time series and spectral density analyses are produced.

Limits:
: A screening module, designed to be run each time the CDF file is updated. Produces time series graphics and written reports indicating time periods when major or minor NHRC category rates exceed local or global confidence limits.

Quit:
: Safe option for exiting EPISYS. Returns control to WINDOWS.

8

3.0 EPISYS OPTION

3.1 About Episys

This sub-menu item displays the EPISYS logo screen. To return to the EPISYS Desktop, press <RETURN>.

3.2 Run Episys Preparation

This sub-menu item performs first-time system initialization. When it is selected, the dialog shown in Figure 2 appears.
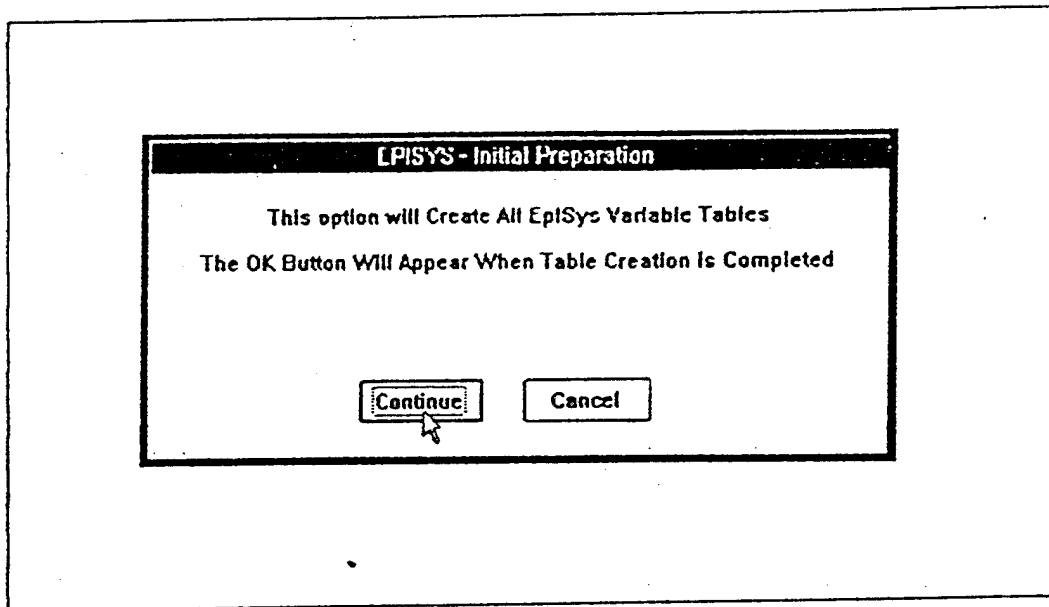
Figure 2. Episys Preparation Dialog.

TO PERFORM EPISYS PREPARATION:

1. To perform initialization, click "CONTINUE".

2. To abort initialization, click "CANCEL".

   On completion, system returns to EPISYS Desktop.

If EPISYS has been newly installed or modified, this option MUST be run before any analysis can be performed.

CAUTION! This option resets EPISYS to an initial start-up state. If it is executed, some or all previous analyses might be lost.

4.0 MULTIVARIATE OPTION

4.1 Overview

The multivariate option performs analyses based on the simultaneous dependent variables NHRC category and month-of-the-year. NHRC categories can be major categories, minor categories, or individual NHRC diagnosis/classification codes. The analyses include the following (see NHRC Technical Report N66001-89-0185 for analytical methods):

o   incidence frequencies tabulated by independent ancillary variables sex, race, age, branch, grade, occupation, duty platform, and ocean region.

o   classification analysis and two-way tables based on the two dependent variables.

o   multiple discriminant analysis to show the response of the dependent variables to the independent ancillary variables.

o   sample stratification and size allocation based on the independent ancillary variables.

o   raw time series and spectral density analysis.

There are six sub-menu items under Multivariate Analysis. Note that for a completely new multivariate analysis, each menu item must be completed in order. If this is not done, unexpected results could occur. If an item is selected that requires the results of a previous analysis and that analysis has not been performed, a warning message appears with information on how to remedy the error. Each sub-menu item is described in subsequent sections.

4.2 Select Multivariate Options

When this item is selected, the dialog shown in Figure 3 appears.

TO ENTER/MODIFY CONFIDENCE LEVEL ASSOCIATED WITH TYPE I ERROR:

1.   Enter or modify value according to instructions in section 1.7.

2.   If value is out of range, a warning message appears. Click "OK" or press <RETURN>, then reenter value.

Several multivariate analyses use statistical tests of significance. The confidence level is the probability of accepting a test result as true when it is, in fact, true; the same value is used for all multivariate analyses.

10

Figure 3. Multivariate Option Dialog.

TO ENTER/MODIFY MEAN DEVIATION:

1. Enter or modify according to instructions in section 1.7.

2. If value is out of range, a warning message appears. Click "OK" or press <RETURN>, then reenter value.

Mean deviation is used to determine stratified sample sizes. For instance, a value of 0.1 results in sample sizes large enough to detect a 10% difference between mean incident rates. The smaller the value, the larger the sample sizes.

TO SELECT SCALING FACTOR FOR INCIDENT RATE OUTPUT:

1. Select scale factor according to instructions in section 1.7.

Value has no effect on analyses, only output. Only one scaling factor may be selected. Figure 3 demonstrates selection of "# per 100,000 person-days at risk" as the scaling factor.

11

TO EXIT:

1. To save selections, Click "OK".

2. To discard selections, Click "Cancel":

   System will return to EPISYS Desktop.

4.3 Define Data Structure

This options selects the EPISYS data management module. When selected, the dialog shown in Figure 4 appears.
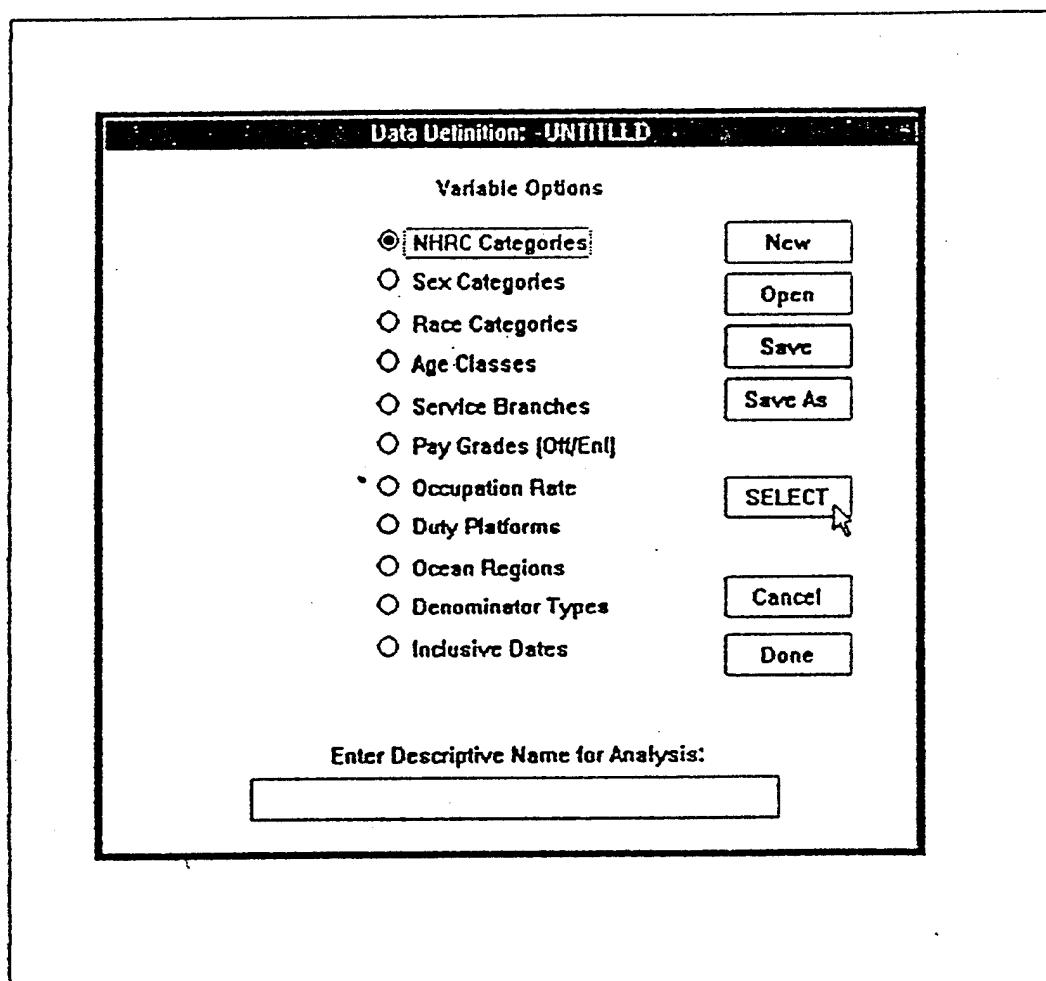
Figure 4. Data Definition Dialog.

TO CREATE NEW DATA DEFINITION:

1. Click "NEW".

   This can be done at any time. A default definition is created and "UNTITLED" appears in the dialog caption.

2. Modify default definition (see procedure below).

3. Enter descriptive name (see procedure below).

4. Name new definition (see procedure below).

TO ACCESS AND MODIFY EXISTING DATA DEFINITION:

1. Click "OPEN".

   Dialog changes to Figure 5.

2. Select definition name according to instructions in section 1.7.

3. To accept or reject highlighted name, click "OK" or "CANCEL" (below selection list).

   Dialog changes back to Figure 4. Selected definition becomes active and its name appears in the dialog caption.

TO NAME NEW DEFINITION: .

1. Click "SAVE AS".

   Dialog changes to Figure 6.

2. Enter name in "Save Definition As" field according to instructions in section 1.7. Name must begin with a character and must be one to eight characters long. Upper and lower case does not matter. No blanks are allowed.

3. To accept or reject name, click "OK" or "CANCEL" (below selection list).

   Dialog changes back to Figure 4. Selected definition becomes active and its name appears in the dialog caption.

   If name already exists, a warning message appears offering the opportunity to abort. Otherwise, the existing definition with the same name will be overwritten.

13
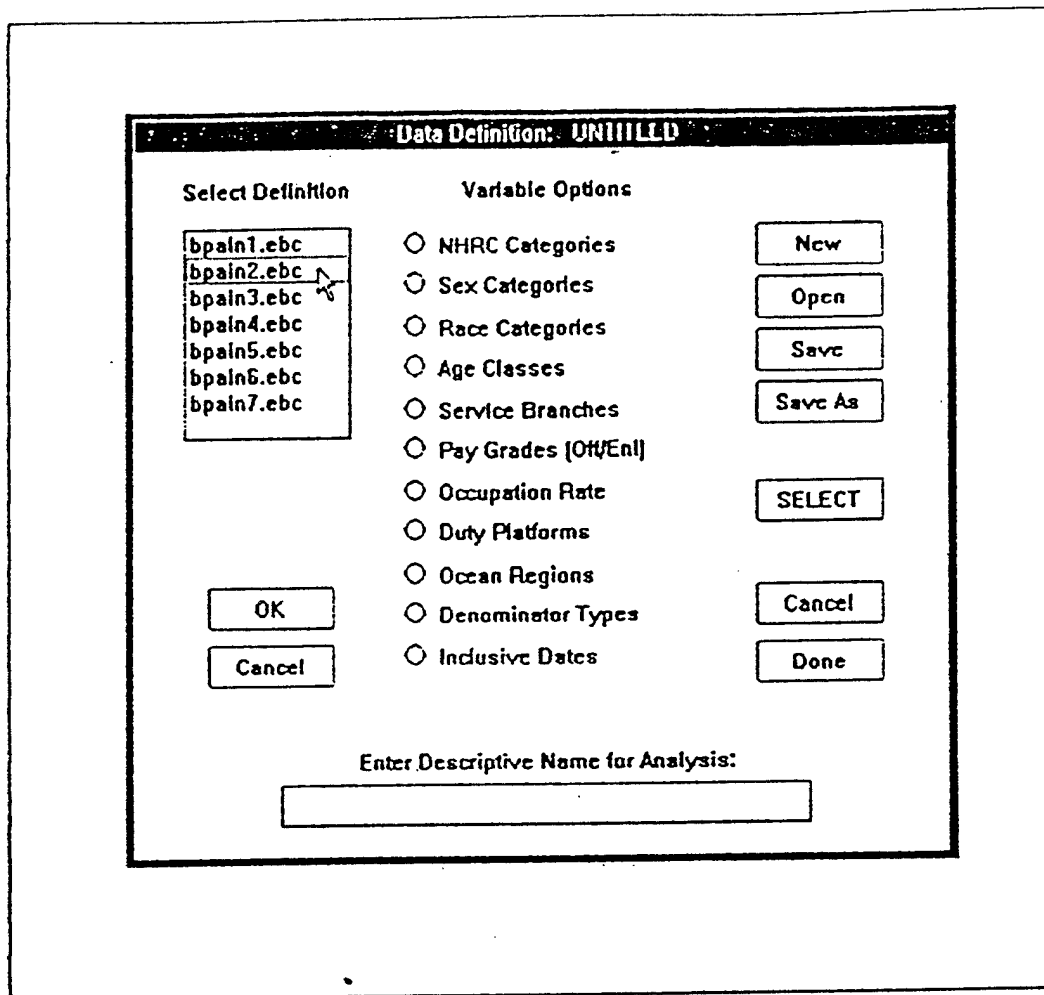
Figure 5. Data Definition Dialog - Existing Definition.

TO ENTER DESCRIPTIVE NAME:

1. Enter description according to instructions in section 1.7.

   Description may consist of characters, numbers, and embedded blanks.

TO MODIFY DEFAULT OR EXISTING DEFINITION:

1. Click one item from "Variable Options" list.

2. Click "SELECT".

   The appropriate dialog appears. Instructions for each variable entry/modification procedure are given in sections 4.3.1 through 4.3.11.

3. On completion, click "SAVE" or "SAVE AS".

14

Figure 6. Data Definition Dialog - New Definition.

TO EXIT:

1. To save selections, click "OK".

2. To reject selections, click "CANCEL".

    If new or existing definition is active and not saved, a warning message appears giving the opportunity to save the definition before exiting.

15

4.3.1 NHRC Categories

.When this option is selected, the dialog shown in Figure 7 appears.
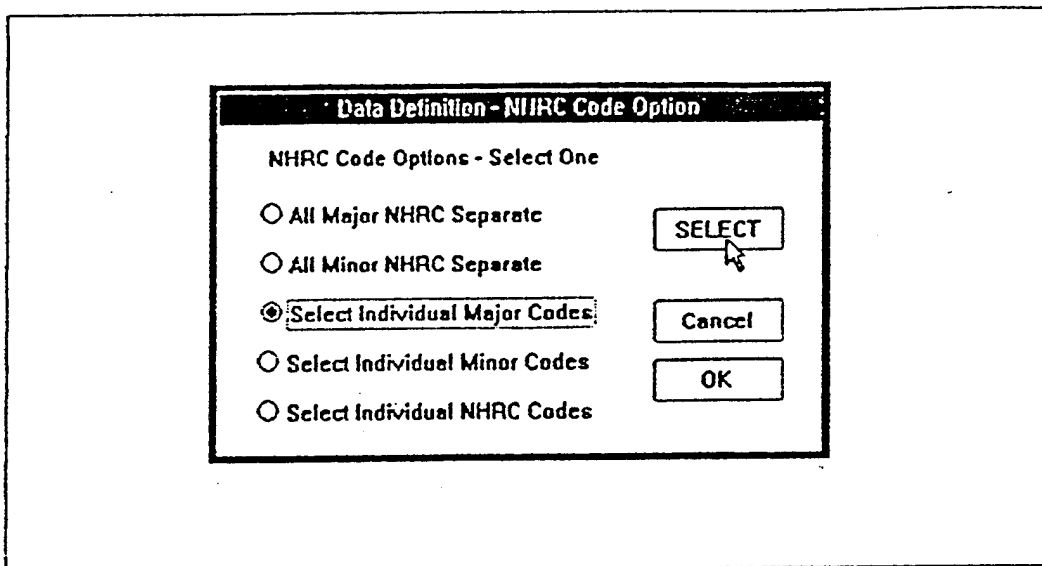
Figure 7. NHRC Category Selection Dialog.

TO SELECT ALL MAJOR OR MINOR NHRC CATEGORIES:

1. For major categories, click "All Major NHRC Categories".

2. For minor categories, click "All Minor NHRC Categories".

   See Technical Reference for lists and definitions of major and minor NHRC categories.

TO SELECT INDIVIDUAL MAJOR CATEGORIES:

1. Click "Select Individual Major Codes".

2. Click "SELECT".

3. Follow instructions in section 4.3.1.1.

TO SELECT INDIVIDUAL MINOR CATEGORIES:

1. Click "Select Individual Minor Codes".

2. Click "SELECT".

3. Follow instructions in section 4.3.1.2.

.16

<u>TO SELECT INDIVIDUAL NHRC CODES</u>:

1. Click "Select Individual NHRC Codes".

2. Click "SELECT".

3. Follow instructions in section 4.3.1.3.

<u>TO EXIT</u>:

1. To save selections, click "OK".

2. To reject selections, click "CANCEL".

4.3.1.1 Select Individual Major Categories

When this option is selected, the dialog shown in Figure 8 appears.
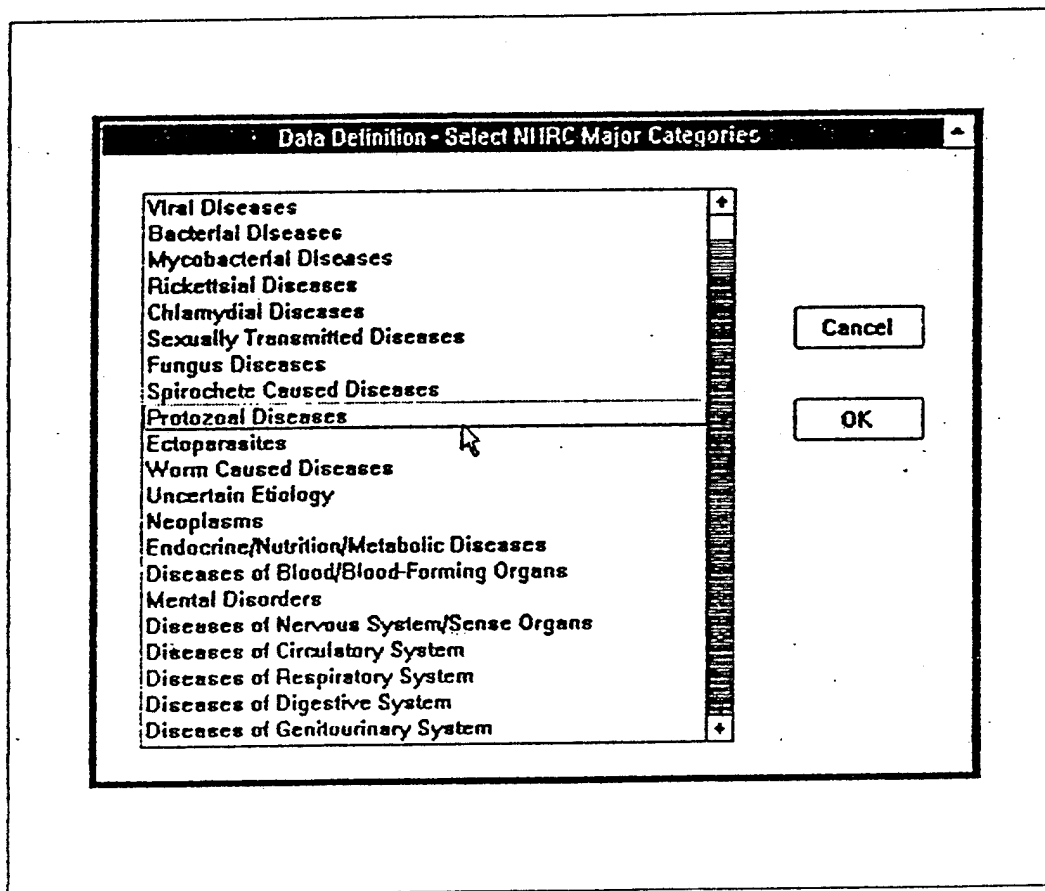
Figure 8. Major Category Selection Dialog.

17

TO SELECT NHRC MAJOR CATEGORIES:

1. Select or de-select according to instructions in section 1.7.

2. To exit and save selections, click "OK".

3. To exit and reject selections, click "CANCEL".

4.3.1.2 Select Individual Minor Categories

When this option is selected, the dialog shown in Figure 9 appears.
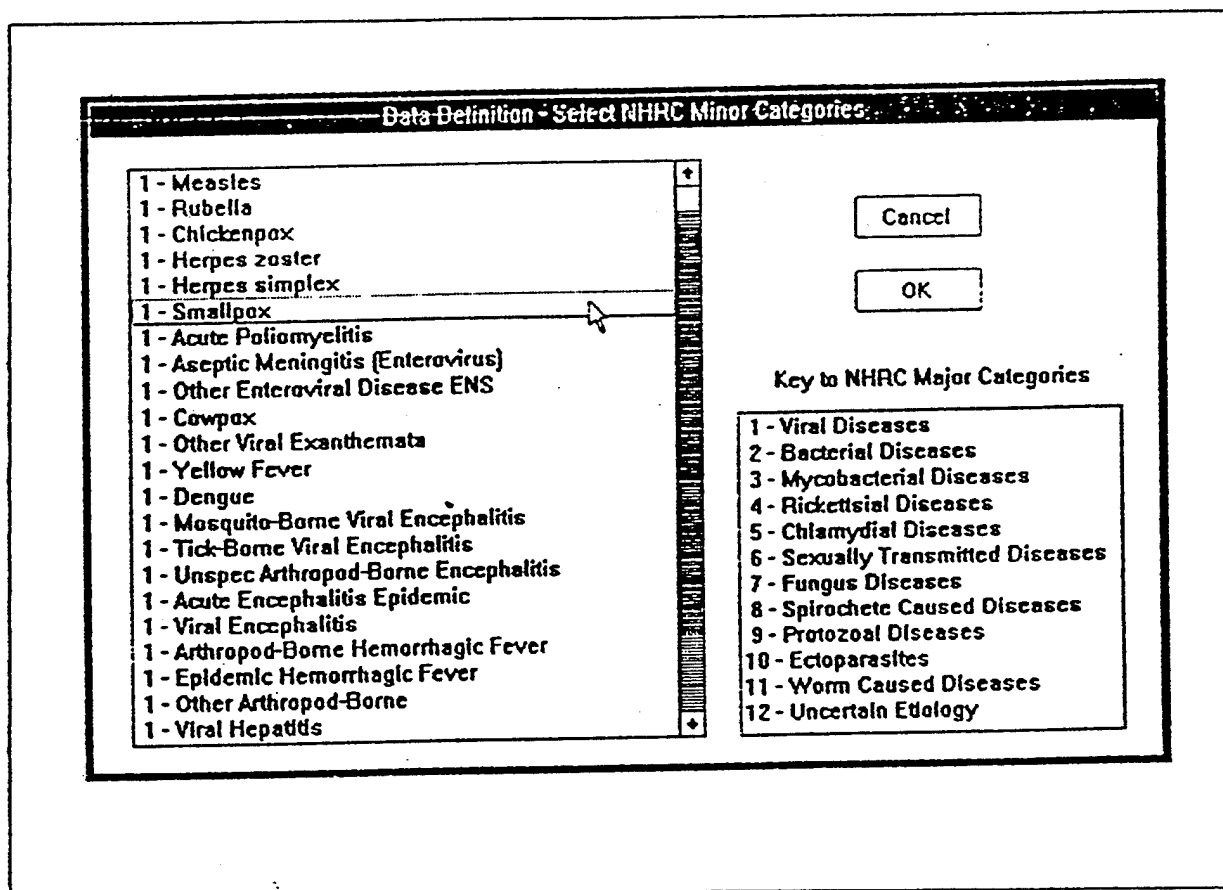
Figure 9. Minor Category Selection Dialog.

TO SELECT NHRC MINOR CATEGORIES:

1. Select or de-select according to instructions in section 1.7.

2. To exit and save selections, click "OK".

3. To exit and reject selections, click "CANCEL".

18

4.3.1.3 Select Individual NHRC Categories

When this option is selected, the dialog shown in Figure 10 appears.

```
┌─────────────────────────────────────────────────────────┐
│                                                          │
│        ┌───────────────────────────────────────────┐     │
│        │ ▓▓ Data Definition - Select NHRC Codes ▓▓ │     │
│        │                                           │     │
│        │  Enter NHRC Codes: Any Five Characters    │     │
│        │                                           │     │
│        │   ┌────────┐     ┌────────┐                │     │
│        │   │ 11001  │     │        │                │     │
│        │   └────────┘     └────────┘                │     │
│        │   ┌────────┐     ┌────────┐                │     │
│        │   │ 11002  │     │        │                │     │
│        │   └────────┘     └────────┘                │     │
│        │   ┌────────┐     ┌────────┐    ┌────────┐   │     │
│        │   │ 11003  │     │        │    │ Cancel │   │     │
│        │   └────────┘     └────────┘    └────────┘   │     │
│        │   ┌────────┐     ┌────────┐                │     │
│        │   │        │     │        │                │     │
│        │   └────────┘     └────────┘    ┌────────┐   │     │
│        │   ┌────────┐     ┌────────┐    │   OK   │   │     │
│        │   │        │     │        │    └────────┘   │     │
│        │   └────────┘     └────────┘                │     │
│        │   ┌────────┐     ┌────────┐                │     │
│        │   └────────┘     └────────┘                │     │
│        │   ┌────────┐     ┌────────┐                │     │
│        │   └────────┘     └────────┘                │     │
│        │   ┌────────┐     ┌────────┐                │     │
│        │   └────────┘     └────────┘                │     │
│        │   ┌────────┐     ┌────────┐                │     │
│        │   └────────┘     └────────┘                │     │
│        │   ┌────────┐     ┌────────┐                │     │
│        │   └────────┘     └────────┘                │     │
│        └───────────────────────────────────────────┘     │
│                                                          │
└─────────────────────────────────────────────────────────┘
```

Figure 10.   Individual NHRC Code Selection Dialog.

TO SELECT INDIVIDUAL NHRC CODES:

1. Select or de-select according to instructions in section 1.7.

2. To exit and save selections, click "OK".

3. To exit and reject selections, click "CANCEL".

4.3.2 Sex Categories

When this option is selected, the dialog shown in Figure 11 appears.
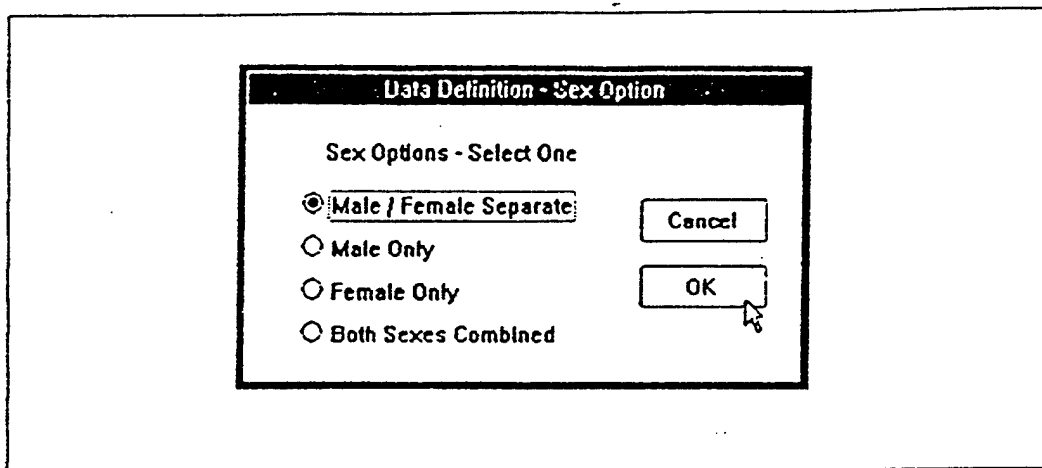
Figure 11. Sex Category Selection Dialog.

TO SELECT SEX CATEGORY:

1. Select category according to instructions in section 1.7.

2. To exit and save selection, click "OK".

3. To exit and reject selection, click "CANCEL".

4.3.3 Race Categories

When this option is selected, the dialog shown in Figure 12 appears.
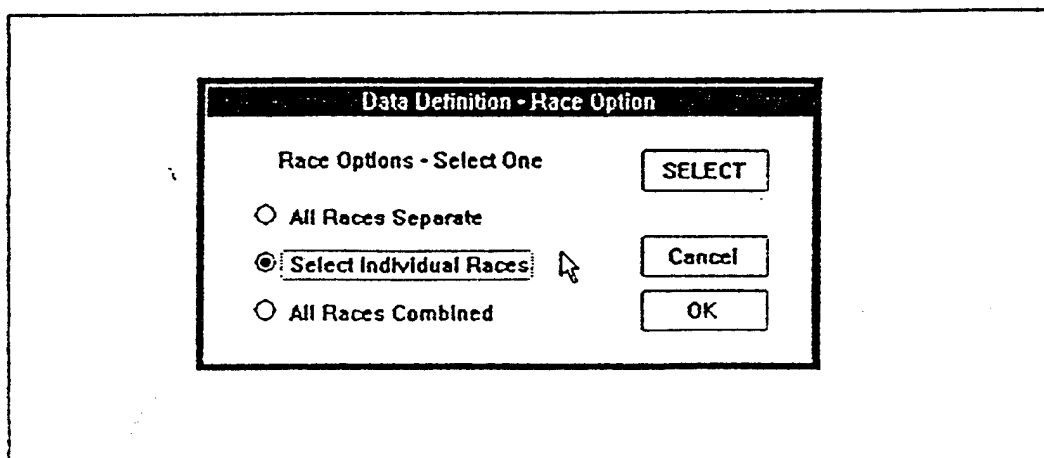
Figure 12. Race Category Selection Dialog.

20

TO SELECT RACE CATEGORY:

1. Select category according to instructions in section 1.7.

2. For individual races, click "SELECT".

   The Individual Race dialog appears. Follow instructions below.

3. To exit and save selection, click "OK".

4. To exit and reject selection, click "CANCEL".

TO SELECT INDIVIDUAL RACES (FIGURE 13):

1. Select or de-select according to instructions in section 1.7.

2. To exit and save selections, click "OK".

3. To exit and reject selections, click "CANCEL".
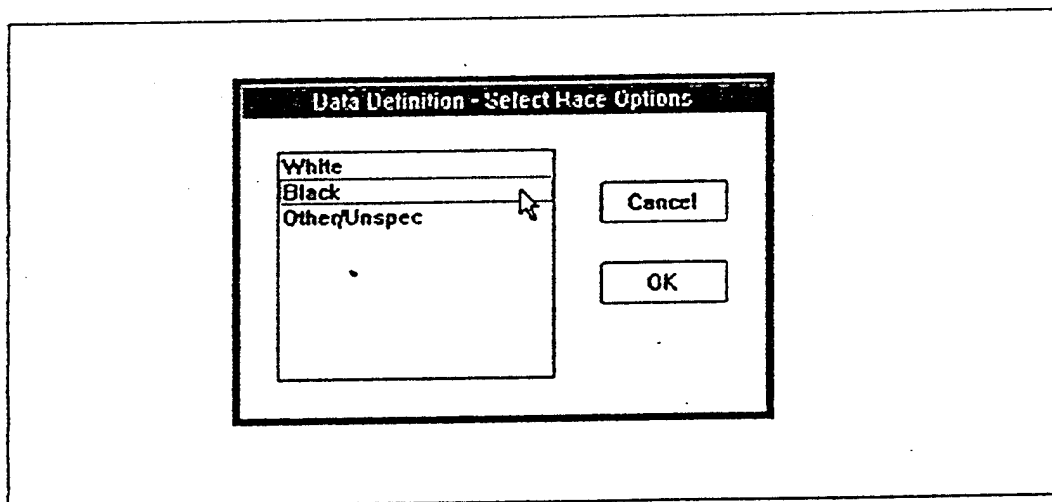
Figure 13. Individual Race Selection Dialog.

4.3.4 Age Classes

When this option is selected, the dialog shown in Figure 14 appears.

TO SELECT AGE CLASS CATEGORY:

1. Select category according to instructions in section 1.7.

2. For non-standard age classes, click "SELECT".

   The non-standard age class dialog appears. Follow instructions below.

21

3. To exit and save selection, click "OK".

4. To exit and reject selection, click "CANCEL".
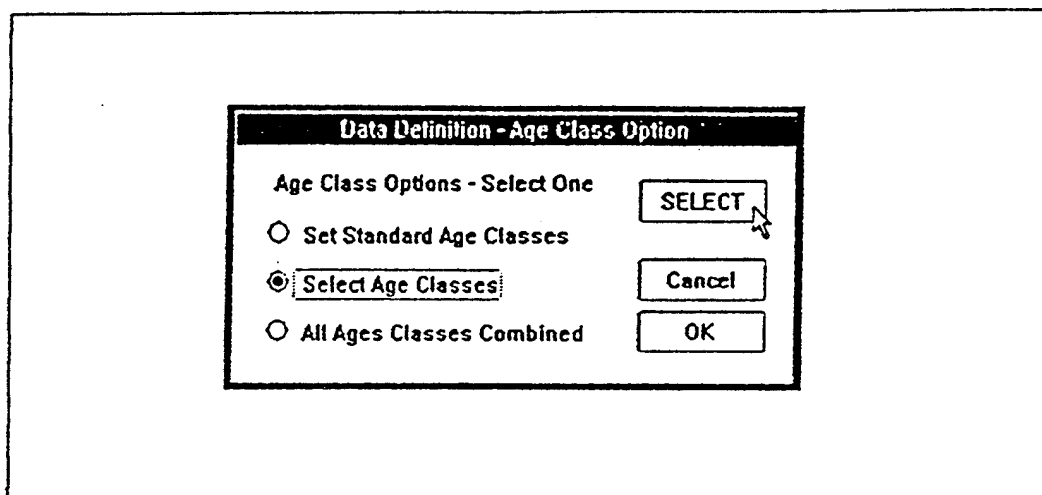
Figure 14. Age Class Selection Dialog.

TO SELECT NON-STANDARD AGE CLASSES (FIGURE 15):

1. Enter beginning ages for each age class and the ending age for last class immediately after the last beginning age.

3. Click "SHOW CLASSES".

   Full age class definitions appear (Figure 16).

3. To exit and save selections, click "OK".

4. To exit and reject selections, click "CANCEL".

22

Figure 15.   Non-Standard Age Class Dialog - Initial.

23

Figure 16. Non-Standard Age Class Dialog - Final.

4.3.5 Service Branches

When this option is selected, the dialog shown in Figure 17 appears.

Figure 17. Service Branch Selection Dialog.

<u>TO SELECT SERVICE BRANCH CATEGORY</u>:

1. Select category according to instructions in section 1.7.

2. To exit and save selection, click "OK".

3. To exit and reject selection, click "CANCEL".

4.3.6 Pay Grades

When this option is selected, the dialog shown in Figure 18 appears.
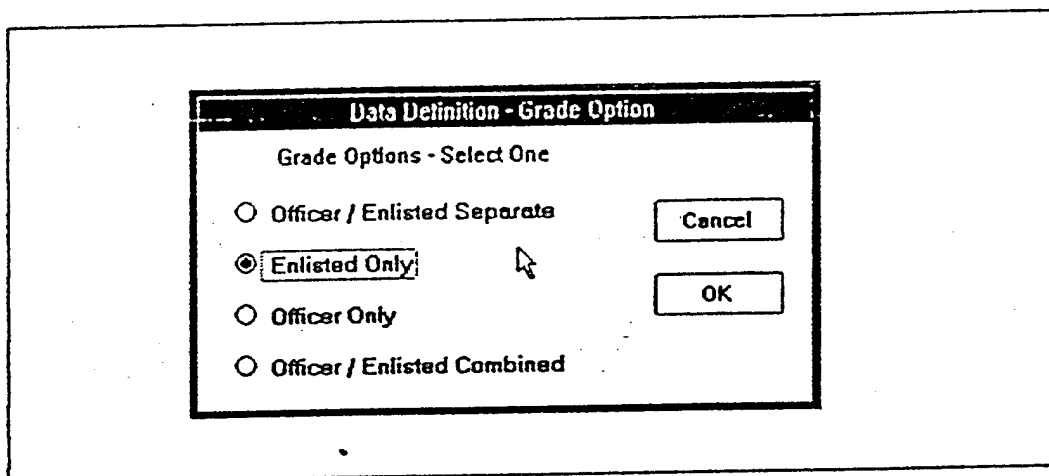
Figure 18. Pay Grade Selection Dialog.

<u>TO SELECT PAY GRADE CATEGORY</u>:

1. Select category according to instructions in section 1.7.

2. To exit and save selection, click "OK".

3. To exit and reject selection, click "CANCEL".

25

E - 28

4.3.7 Occupation Rates

When this option is selected, the dialog shown in Figure 19 appears.

TO SELECT OCCUPATION RATE CATEGORY:

1. Select category according to instructions in section 1.7.

2. For individual occupation rates, click "SELECT".

   The individual occupation rate dialog appears. Follow instructions below.

3. To exit and save selection, click "OK".

4. To exit and reject selection, click "CANCEL".
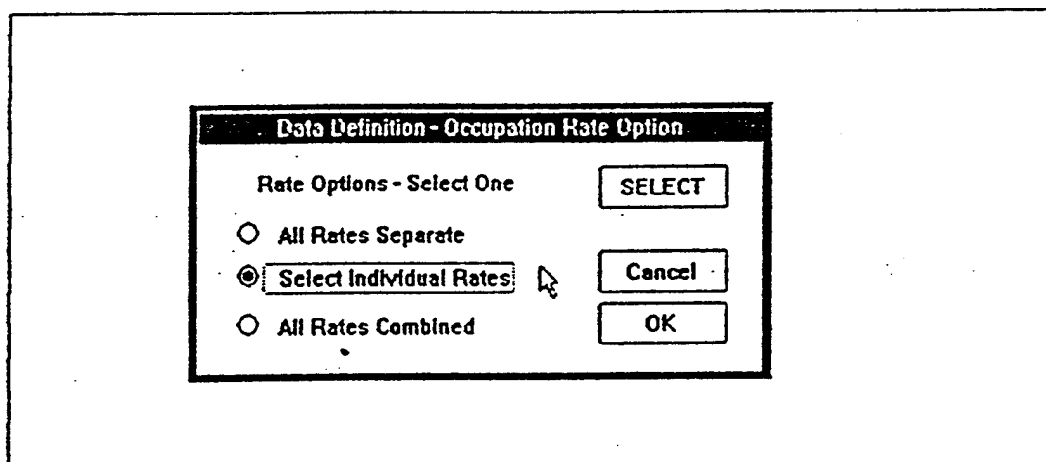
Figure 19. Occupation Rate Selection Dialog.

TO SELECT INDIVIDUAL RATES (FIGURE 20):

1. Select or de-select according to instructions in section 1.7.

2 To exit and save selections, click "OK".

3. To exit and reject selections, click "CANCEL".

26
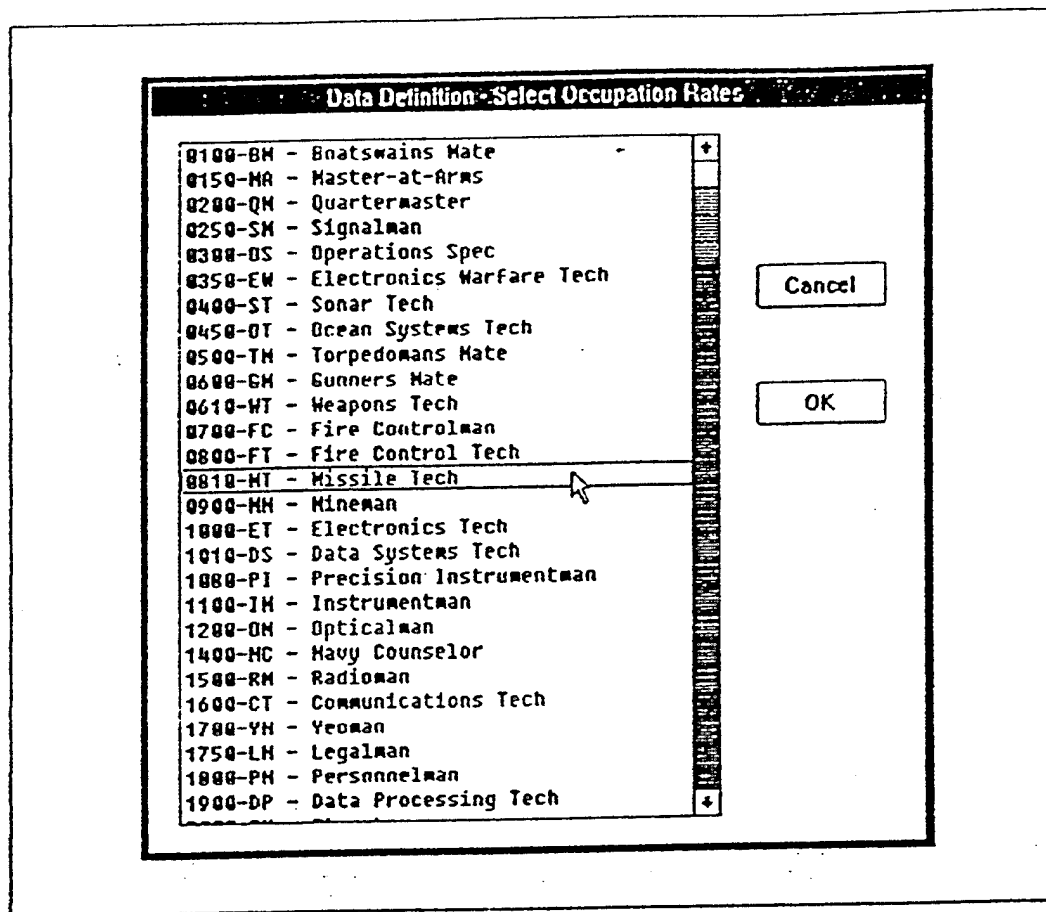
Figure 20. Individual Occupation Rate Selection Dialog.

4.3.8 Duty Platform

When this option is selected, the dialog shown in Figure 21 appears.
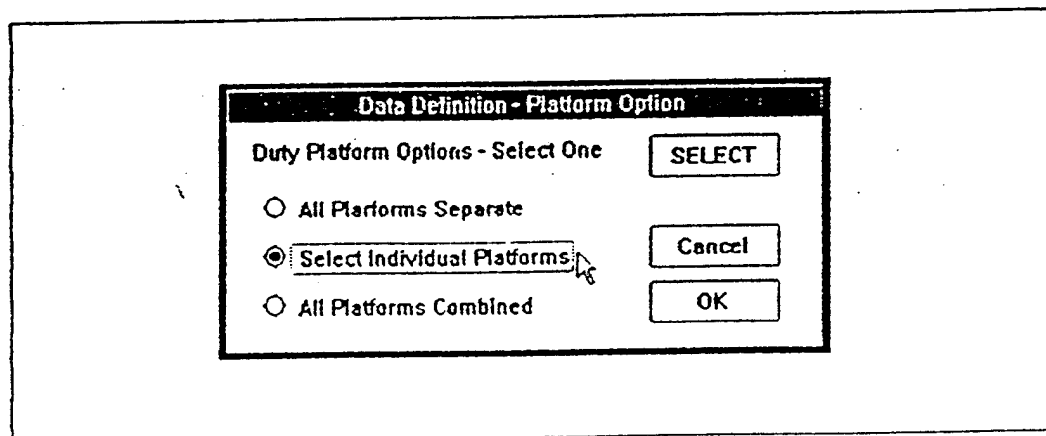
Figure 21. Duty Platform Selection Dialog.

27

<u>TO SELECT DUTY PLATFORM CATEGORY</u>:

1. Select category according to instructions in section 1.7.

2. For individual duty platforms, click "SELECT".

   The individual duty platyform dialog appears. Follow instructions below.

3. To exit and save selection, click "OK".

4. To exit and reject selection, click "CANCEL".

TO SELECT INDIVIDUAL DUTY PLATFORMS (FIGURE 22):

1. Select or de-select according to instructions in section 1.7.

2. To exit and save selections, click "OK".

3. To exit and reject selections, click "CANCEL".
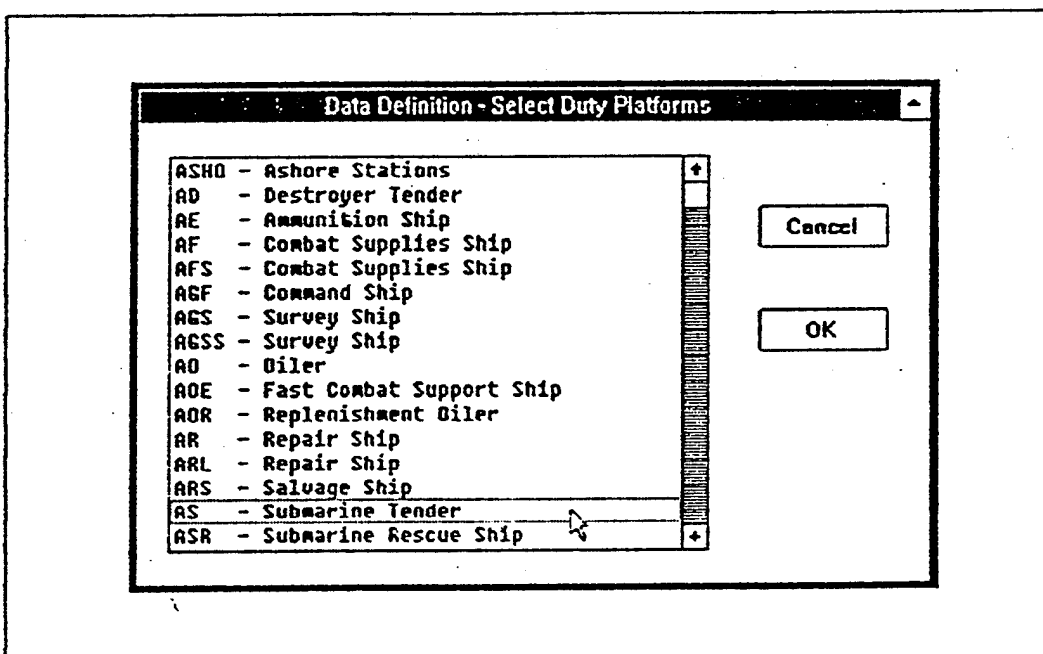
Figure 22.   Individual Duty Platform Selection Dialog.

4.3.9 Ocean Region

When this option is selected, the dialog shown in Figure 23 appears.
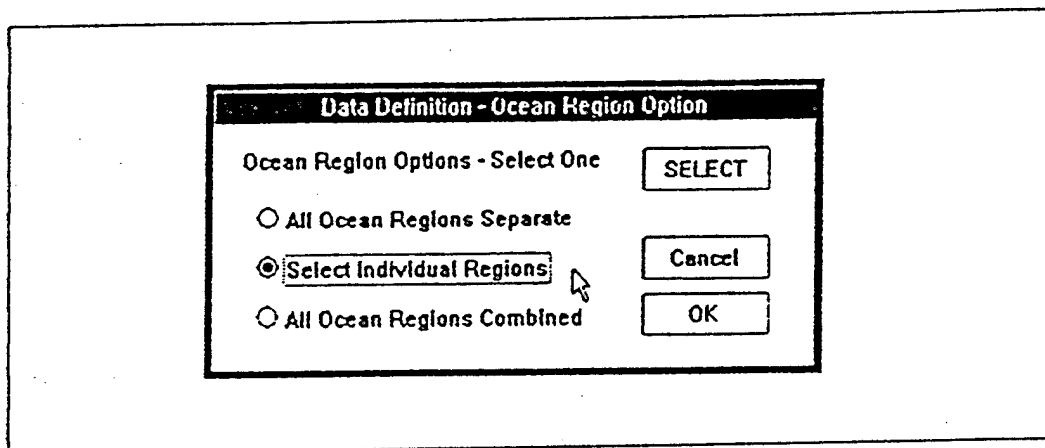
Figure 23. Ocean Region Selection Dialog.

TO SELECT OCEAN REGION CATEGORY:

1. Select category according to instructions in section 1.7.

2. For individual ocean.regions, click "SELECT".

   The individual ocean region dialog appears. Follow instructions below.

3. To exit and save selection, click "OK".

4. To exit and reject selection, click "CANCEL".

TO SELECT INDIVIDUAL OCEAN REGIONS (FIGURE 24):

1. Select or de-select according to instructions in section 1.7.

2. To exit and save selections, click "OK".

3. To exit and reject selections, click "CANCEL".
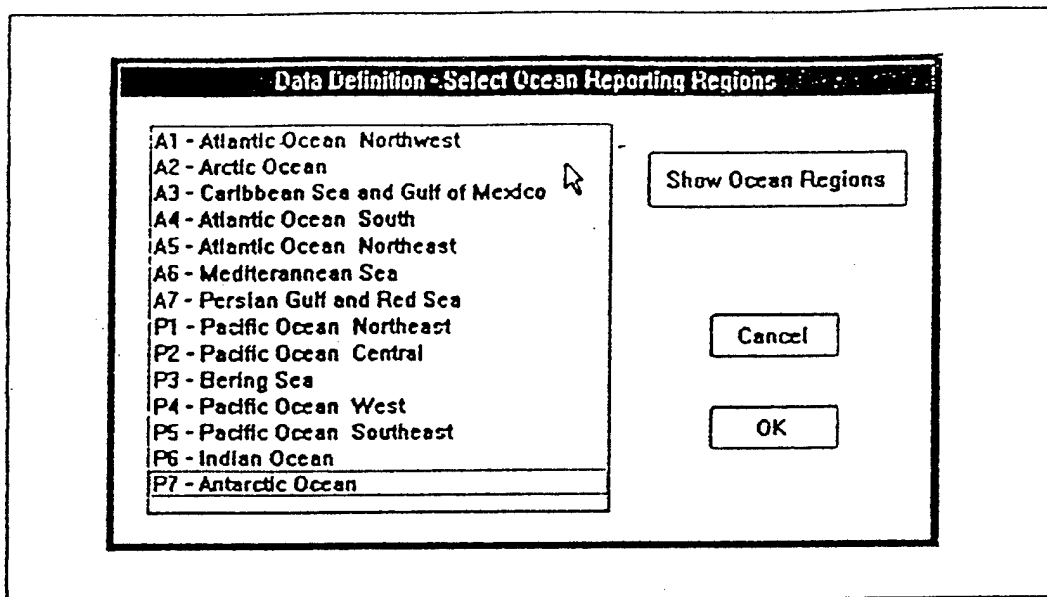
Figure 24. Individual Ocean Region Selection Dialog.

4.3.10 Denominator Type

When this option is selected, the dialog shown in Figure 25 appears.

TO SELECT DENOMINATOR TYPE:

1. Select option according to instructions in section 1.7.

3. To exit and save selection, click "OK".

4. To exit and reject selection, click "CANCEL".
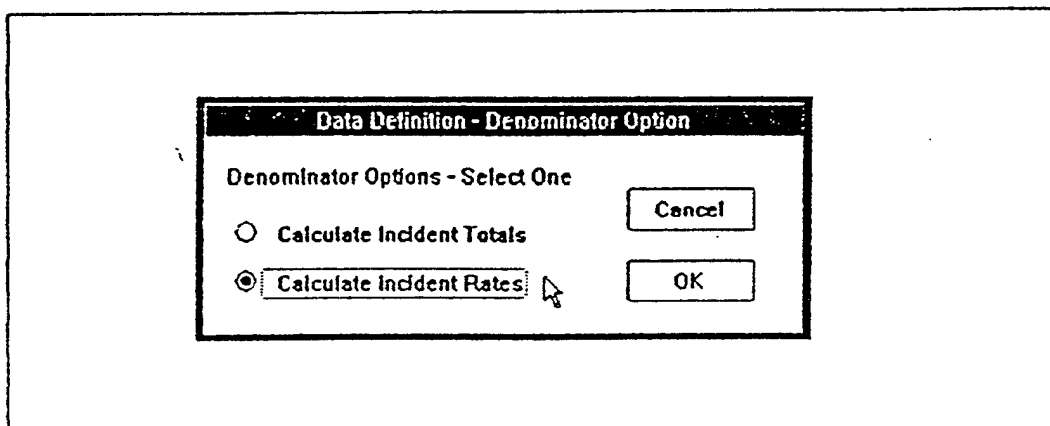
Figure 25. Denominator Type Selection Dialog.

30

4.3.11 Inclusive Dates

When this option is selected, the dialog shown in Figure 26 appears.


```
╔══════════ Data Definition - Inclusive Dates ══════════╗

    Inclusive Dates - Enter Both

    Date Range: 01-01-80 => 12-31-88
                                            ┌──────────┐
    Start Date:  [01-01-80]                 │  Cancel  │
                                            └──────────┘
                                            ┌──────────┐
    End Date:    [12-31-88]                 │    OK     │
                                            └──────────┘
```
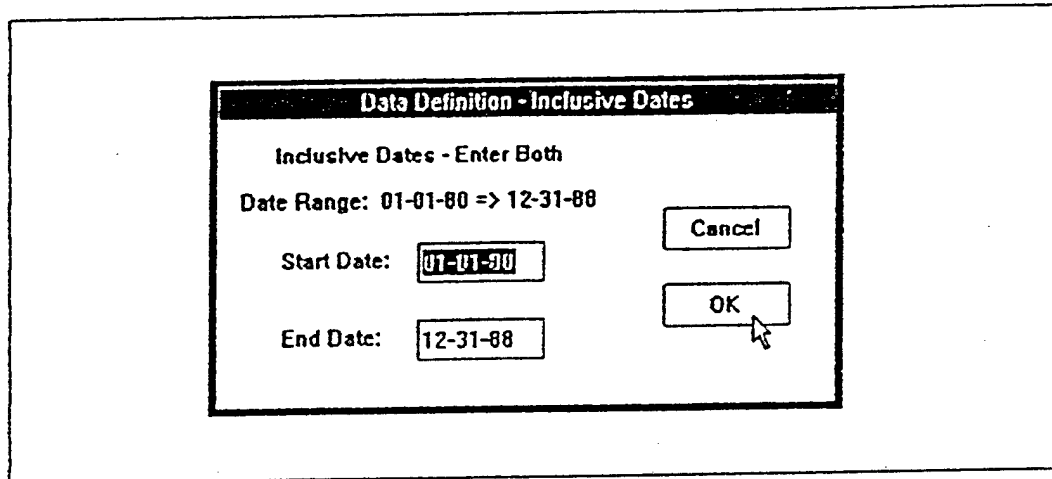
Figure 26.   Inclusive Date Selection Dialog.

TO ENTER DATES:

1. Enter dates according to instructions in section 1.7.

    Date format is MM-DD-YY.

2. To exit and save entries, click "OK".

3. To exit and reject entries, click "CANCEL".

31

4.4 Extract Data

When this item is selected, the dialog shown in Figure 27 appears.
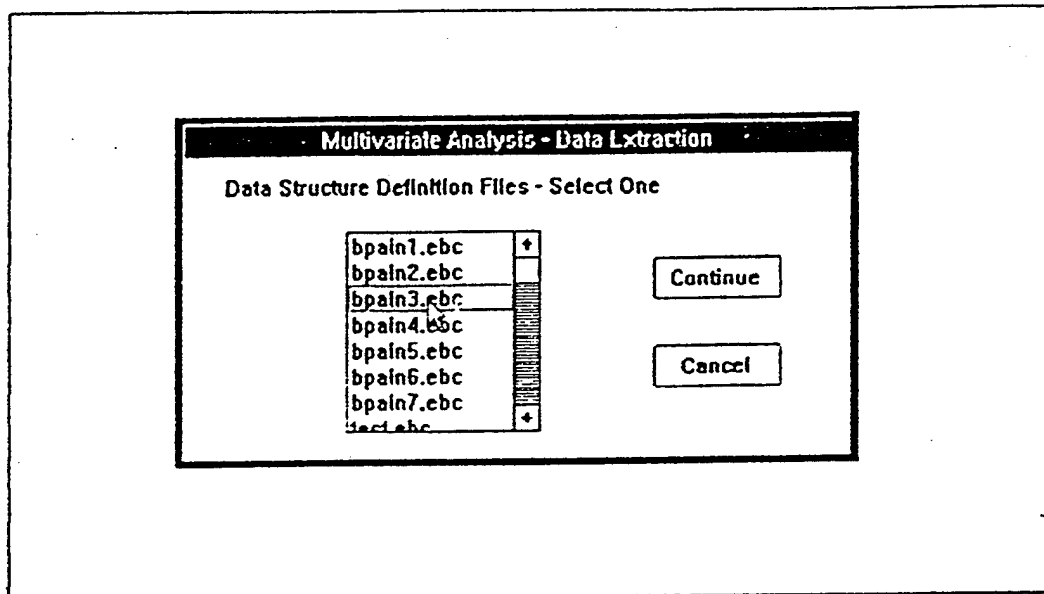
Figure 27. Data Extraction Dialog.

TO SELECT DATA DEFINITION FOR EXTRACTION:

1. Click on the name of the desired definition.

3. To accept definition and perform extraction, click "CONTINUE".

4. To reject selection and return to EPISYS Desktop, click "CANCEL".

During data extraction, a screen appears showing the progress of the extraction. If no records are found that match the selected data structure definition, a message appears stating "NO CASES FOUND". In this instance, no further analysis is possible based on the selected definition.

32

E - 35

4.5 Review Extraction

When this item is selected, the dialog shown in Figure 28 appears.

Figure 28. Review Extraction Dialog.

TO VIEW EXTRACTION TEXT REPORT (Figure 29):

1. Select available report according to instructions in section 1.7.

2. To display on screen, click "SCREEN".

3. To send report to printer, click "PRINTER".

TO VIEW RAW TIME SERIES (Figure 30):

1. Click "Raw Time Series".

2. Enter "Start" and "Stop" days according to instructions in section 1.7.

   Day zero is the first day entered in "Inclusive Dates" (section 4.3.11).

3. Click "GRAPHIC".

```
DATE EXTRACTION REPORT

Back Pain 65909/65910/65923/66208/33003

     Number of Records:   480753
     Number of Cases  :     9839
==================================      ------------------------------------------
Individual NHRC Codes - Selected:
                                        GRADE - Enlisted                    9839
        65909               3492
        65910                 31        ------------------------------------------
        65923                 50
        66208               5607        OCCUPATION RATES - Combined
        33003                659
                            -----       ------------------------------------------
                            9839
                                        DUTY PLATFORMS - Combined            9839
------------------------------------
SEXES - All:                            ------------------------------------------

        Male                9045        OCEAN REGIONS - Combined             9839
        Female               794
                            -----       ------------------------------------------
                            9839
                                        INCLUSIVE DATES:
------------------------------------
RACES - All:                              Selected:  1 Jan 1980  thru  31 Dec 1988
                                          Actual  :  2 Jan 1980  thru  30 Dec 1988
        White               8521
        Black                880          January                            868
        Other/Unspec         438          February                           820
                            -----         March                              905
                            9839          April                              887
                                          May                                897
------------------------------------      Jun                                807
AGE CLASSES - Standard:                   July                               878
                                          August                             818
     1:   17 thru 19        1185          September                          742
     2:   20 thru 21        1321          October                            850
     3:   22 thru 24        1536          November                           727
     4:   25 thru 29        2009          December                           640
     5:   30 thru 34        1639                                            -----
     6:   35 thru 39        1519                                            9839
     7:   40 thru 44         522
     8:   45 thru 61         109        ==========================================
                            -----
                            9839

------------------------------------

SERVICE BRANCH - US Navy    9839

------------------------------------
```

Figure 29. Data Extraction Text Report.

34
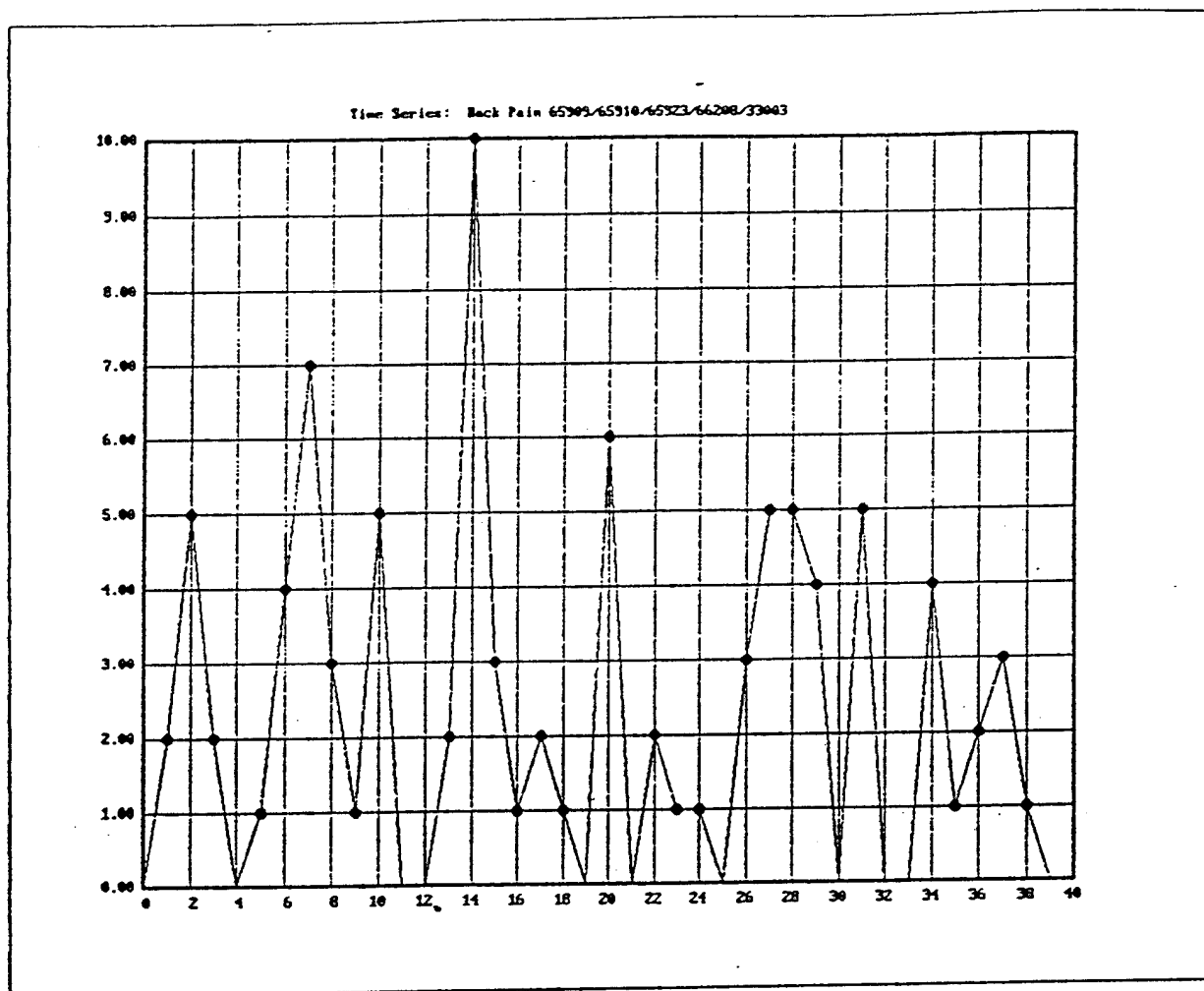
Figure 30. Data Extraction Raw Time Series.

TO VIEW SPECTRAL DENSITY ANALYSIS (Figure 31):

1. Click "Spectral Density".

2. Enter "Start" and "Stop" days according to instructions in section 1.7.

   Day zero is the first day entered in "Inclusive Dates" (section 4.3.11).

4. Click "GRAPHIC".

35

Power Spectral Density: Back Pain 65903/65910/65923/66208/33903
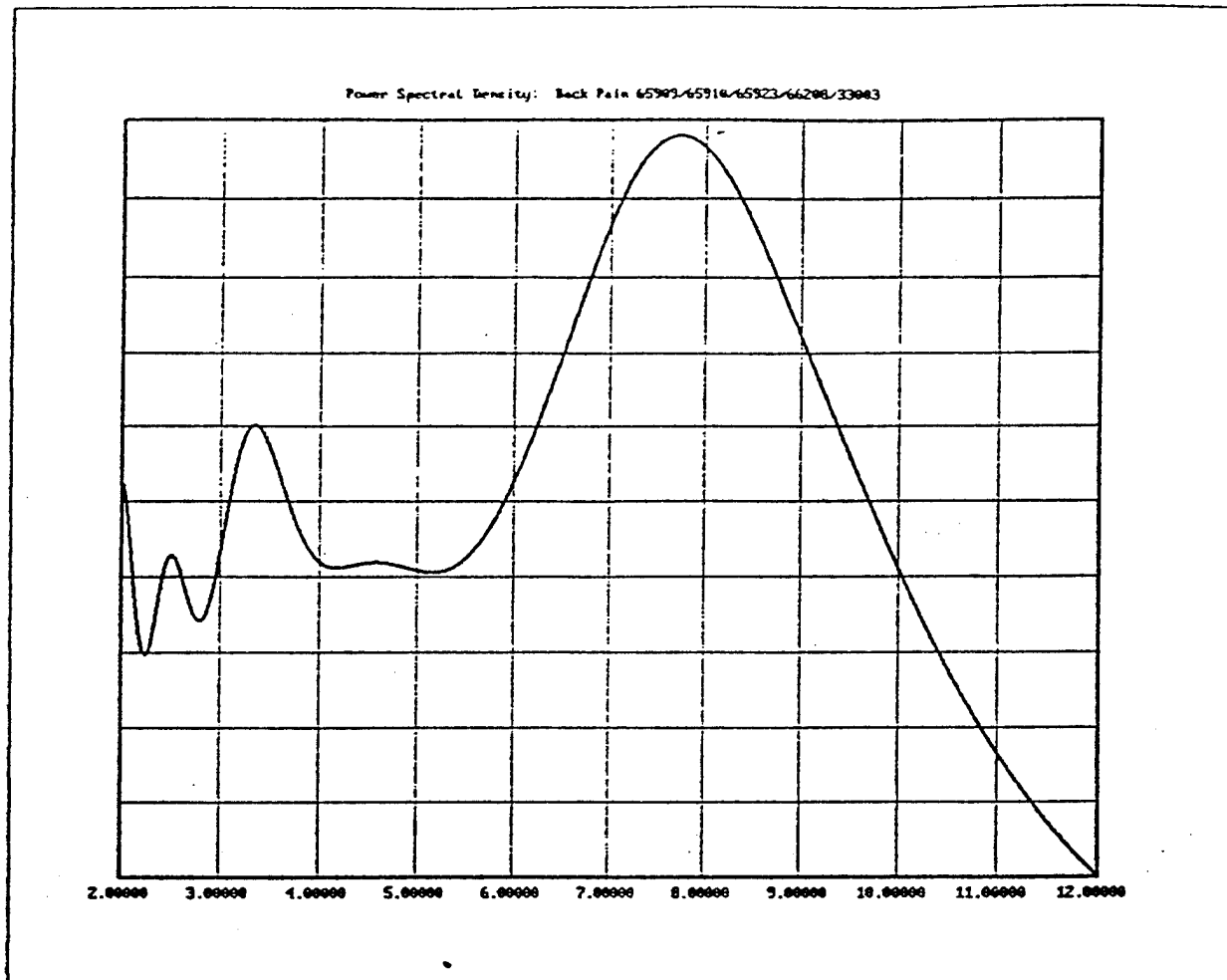
Figure 31. Data Extraction Spectral Density Analysis.

TO EXIT:

1. To exit and return to EPISYS Desktop, click "DONE".

4.6 Perform Analysis

When this item is selected, the dialog shown in Figure 32 appears.

TO SELECT A DATA DEFINITION FOR ANALYSIS:

1. Select an available definition according to instructions in section 1.7.

3. To accept definition and perform extraction, click "CONTINUE".

4. To reject definition and return to EPISYS Desktop, click "CANCEL".

36

During data analysis, a screen appears showing the progress of the analysis and any errors that might occur.
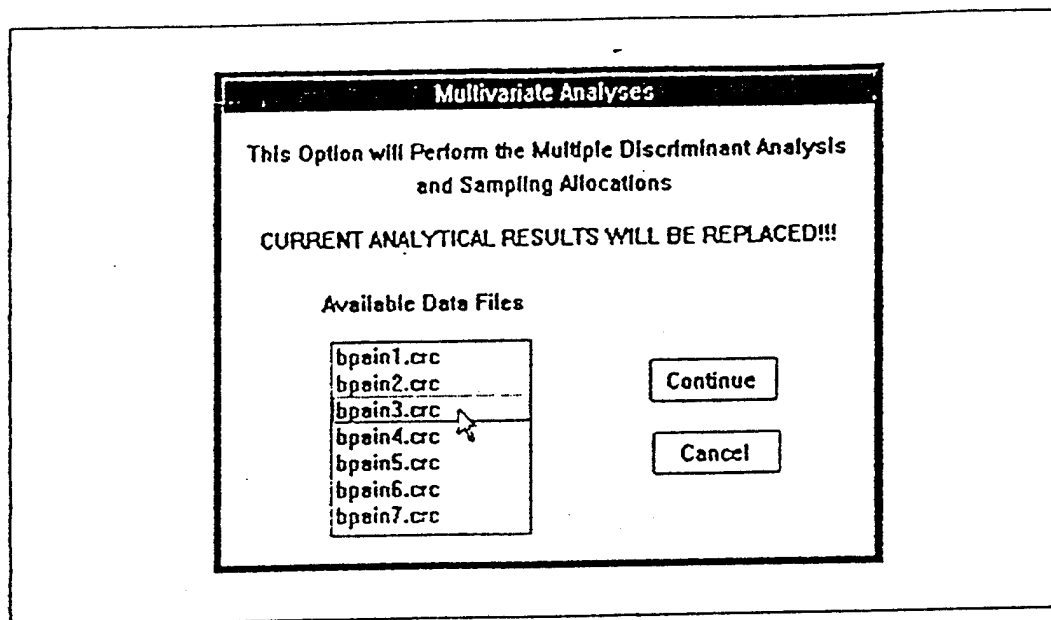
Figure 32.   Perform Analysis Dialog.

4.7 Review Analysis

When this item is selected, the dialog shown in Figure 33 appears.
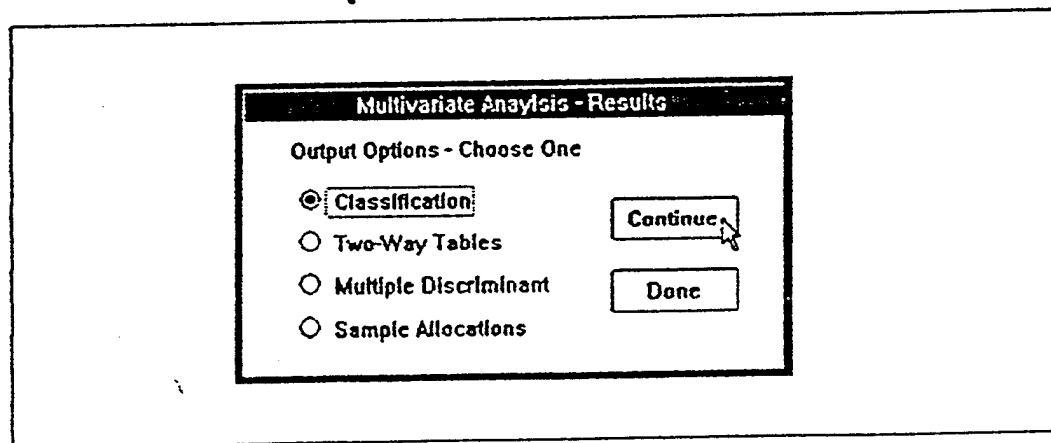
Figure 33.   Review Analysis Dialog.

<u>TO REVIEW ANALYTICAL RESULTS</u>:

1. For dendrograms, click "Classification", then click "CONTINUE".

2. For two-way tables, click "Two-Way Tables", then click "CONTINUE".

-37

E - 40

3. For multiple discriminant results, click "Multiple Discriminant", then click "CONTINUE".

4. For sample stratification and sizes, click "Sample Allocations", then click "CONTINUE".

5. To exit and return to EPISYS Desktop, click "DONE".

4.7.1 Classification

When this option is selected, the dialog shown in Figure 34 appears.
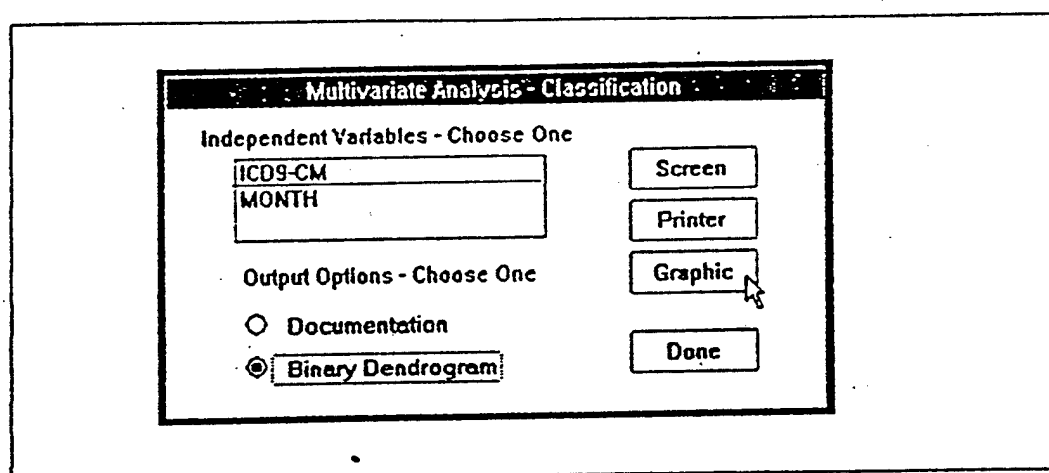
Figure 34.   Review Classification Dialog.

<u>TO VIEW BINARY DENDROGRAM TECHNICAL DOCUMENTATION (Figure 35)</u>:

1. Click "Documentation".

2. To display text report on screen, click "SCREEN".

3. To send text report to printer, click "PRINTER".

4. To exit and return to Review Analysis Dialog, click "DONE".

```
                    MULTIVARIATE CLUSTER ANALYSIS

                        EMTEST - All Major

                 Classification Variable  :  ICD9-CM
                 Independent Variable      :  MONTH
                 Similarity Coefficient    :  Pearson

                 # Classification Variables:  29
                 # Independent Variables  :  12
```

CYCLE	LINKED		COEF	CCCS	ZL	ZU
1	3	12	0.7843	1.0000	1.0000	1.0000
1	6	15	0.7036	1.0000	1.0000	1.0000
1	7	9	0.6945	1.0000	1.0000	1.0000
1	8	10	0.5933	1.0000	1.0000	1.0000
1	11	26	0.5694	1.0000	1.0000	1.0000
1	14	25	0.9147	1.0000	1.0000	1.0000
1	16	28	0.8092	1.0000	1.0000	1.0000
1	17	18	0.9062	1.0000	1.0000	1.0000
1	21	29	0.9173	1.0000	1.0000	1.0000
1	22	27	0.9404	1.0000	1.0000	1.0000
2	3	7	0.4756	0.9559	0.6436	0.9953
2	2	6	0.5369	0.6987	0.6987	0.6987
2	4	8	0.3929	0.8660	0.8660	0.8660
2	13	14	0.5733	0.9929	0.9929	0.9929
2	1	21	0.8945	0.7288	0.7288	0.7288
2	19	22	0.9315	0.5914	0.5914	0.5914
2	20	24	0.7612	1.0000	1.0000	1.0000
3	4	11	0.3580	0.7354	0.1969	0.9330
3	16	20	0.6133	0.6879	-0.2799	0.9623
3	17	23	0.8288	0.7354	0.7354	0.7354
4	4	5	0.2778	0.8156	0.5211	0.9366
4	1	19	0.7816	0.9284	0.7936	0.9763
5	1	17	0.6721	0.8112	0.6580	0.8999
6	1	13	0.3421	0.9328	0.8922	0.9585
7	1	16	0.2130	0.8697	0.8190	0.9075
7	2	3	0.2518	0.8204	0.6018	0.9246
8	1	2	0.0677	0.9148	0.8921	0.9329
9	1	4	0.0096	0.9357	0.9224	0.9468

Figure 35. Binary Dendrogram Technical Documentation.

TO VIEW BINARY DENDROGRAM (Figure 36):

1. Click "Binary Dendrogram".

2. Select an ancillary variable according to instructions in section 1.7.

3. To display dendrogram on screen, click "SCREEN".

4. To send dendrogram to printer, click "PRINTER".

39
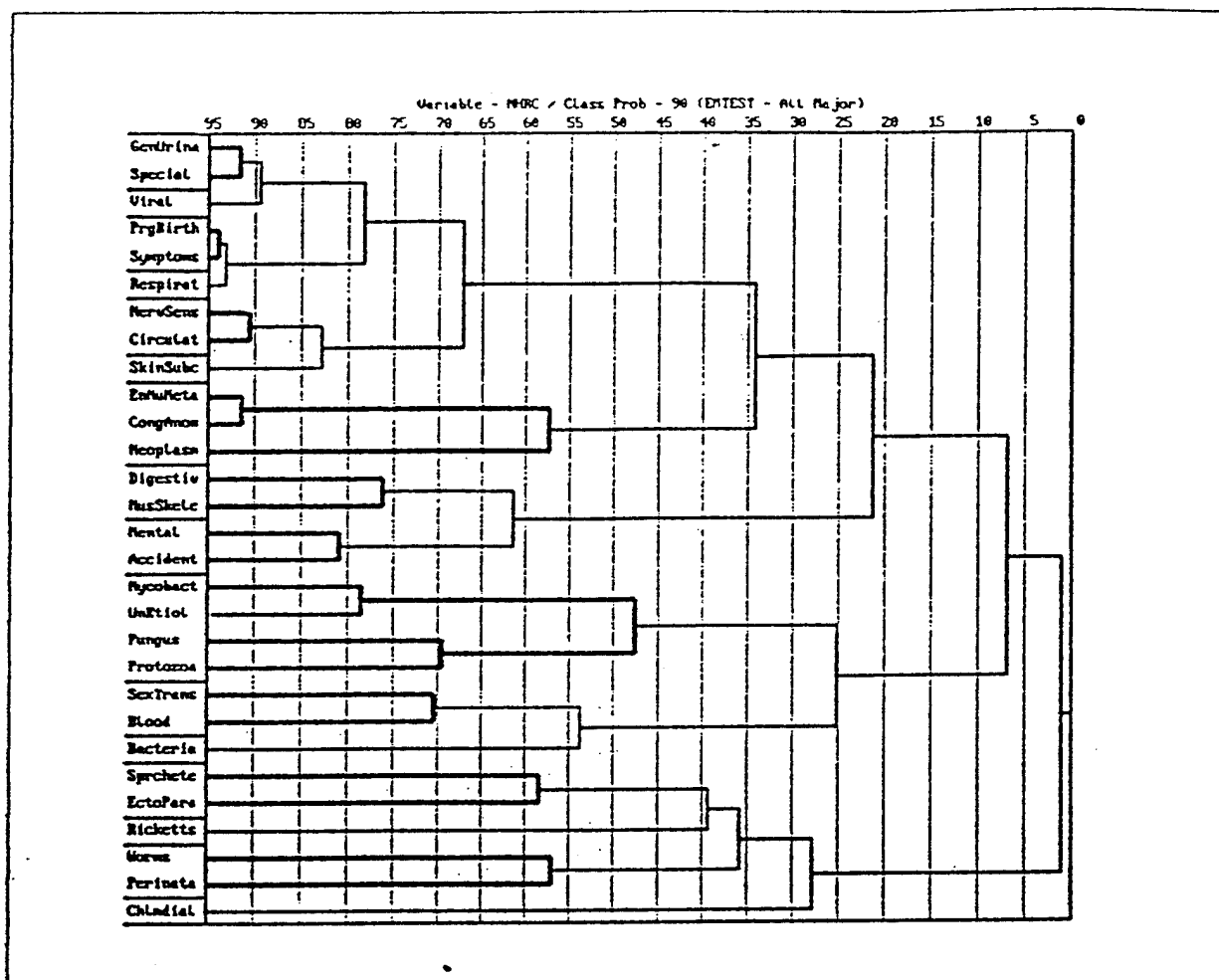
Figure 36. Binary Dendrogram.

TO EXIT:

1. To exit and return to the Review Analysis Dialog, click "DONE".

4.7.2 Two-Way Tables

When this option is selected, the dialog shown in Figure 37 appears.

TO REVIEW TWO-WAY TABLES (Figure 38):

1. Select ancillary variable according to instructions in section 1.7.

2. Select type of table according to instructions in section 1.7.

3. To display two-way table on screen, click "SCREEN".

40

4. To send two-way table to printer, click "PRINTER".

5. To exit and return to Review Results Dialog, click "DONE".
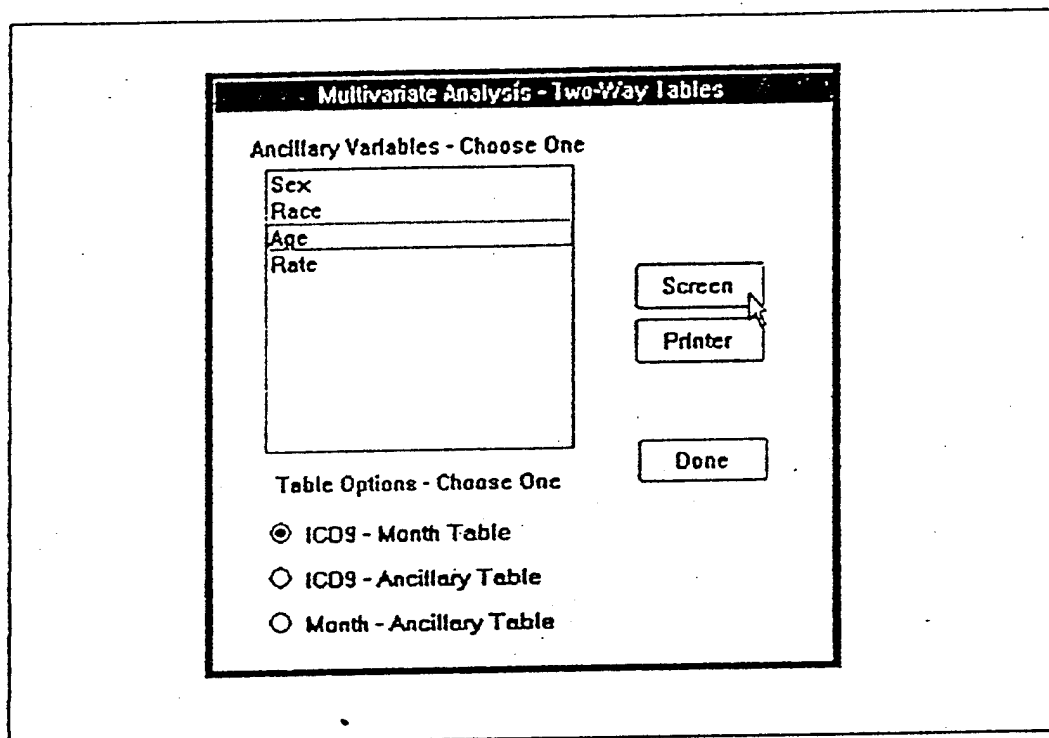
Figure 37. Two-Way Table Dialog.

Figure 38. Two-Way Table.

4.7.3 Multiple Discriminant

When this option is selected, the dialog shown in Figure 39 appears.

TO VIEW MULTIPLE DISCRIMINANT RESULTS (Figures 40 and 41):

1. Select ancillary variables according to instructions in section 1.7.

2. To display text report on screen, click "SCREEN".

3. To send text report to the printer, click "PRINTER".

4. To plot results on screen, click "GRAPHIC".

5. To exit and return to Review Analysis Dialog, click "DONE".

42

Figure 39. Multiple Discriminant Dialog.

MULTIVARIATE STRATIFICATION

EMTEST - All Major

Total Sample Size: 992

Variable - Sex				Stratum 9:	0450-OT	1.303e-03	1
Stratum Definition	Proportion	Sample Size			7100-AG		
Stratum 1: Female	1.701e-02	17			1400-NC		
					7200-TD		
Stratum 2: Male	9.830e-01	975			2500-RP		
					2600-JO		

Variable - Race				Stratum 10:	1750-LN	3.153e-05	0
Stratum Definition	Proportion	Sample Size		Stratum 11:	3100-LI	7.432e-05	0
Stratum 1: White	1.000e+00	992			1200-OM		
Black					3200-DM		
Other					4500-DC		
					1050-PI		

Variable - Age				Stratum 12:	3600-SN	7.487e-01	743
Stratum Definition	Proportion	Sample Size			7300-AN		
Stratum 1: 25-29	4.174e-01	414			3700-MM		
30-34					5000-FN		
35-39					2200-MS		
					6900-AM		
Stratum 2: 17-19	5.826e-01	578			4300-HT		
20-21					1000-ET		
22-24					4000-BT		
40-44					0100-BM		
45-61					4100-EM		

Variable - Rate					0300-OS		
Stratum Definition	Proportion	Sample Size			6200-AD		
Stratum 1: 8000-HM	1.495e-01	148			3800-EN		
					6300-AT		
Stratum 2: 1500-RM	3.972e-02	39			6500-AO		
					0600-GM		
Stratum 3: 1700-YN	2.135e-02	21			6700-AB		
					0400-ST		
Stratum 4: 2000-SK	1.249e-02	12			6800-AE		
					2490-SH		
Stratum 5: 1800-PN	2.077e-02	21			4200-IC		
1600-CT					0800-FT		
8300-OT					0200-QM		
7300-AK					0500-TM		
					0250-SM		
Stratum 6: 1900-DP	2.079e-03	2			5600-BU		
					5500-CM		
Stratum 7: 7400-AZ	3.562e-03	4			6310-AX		
6600-AC					5300-CE		
2100-DK					0810-MT		
					5800-UT		
Stratum 8: 7600-PH	4.496e-04	0			2700-PC		
					5700-SW		
					6180-AV		
					4700-ML		
					5380-EQ		
					5080-CU		
					5280-UC		

Figure 40. Multiple Discriminant Technical Text Report.

44
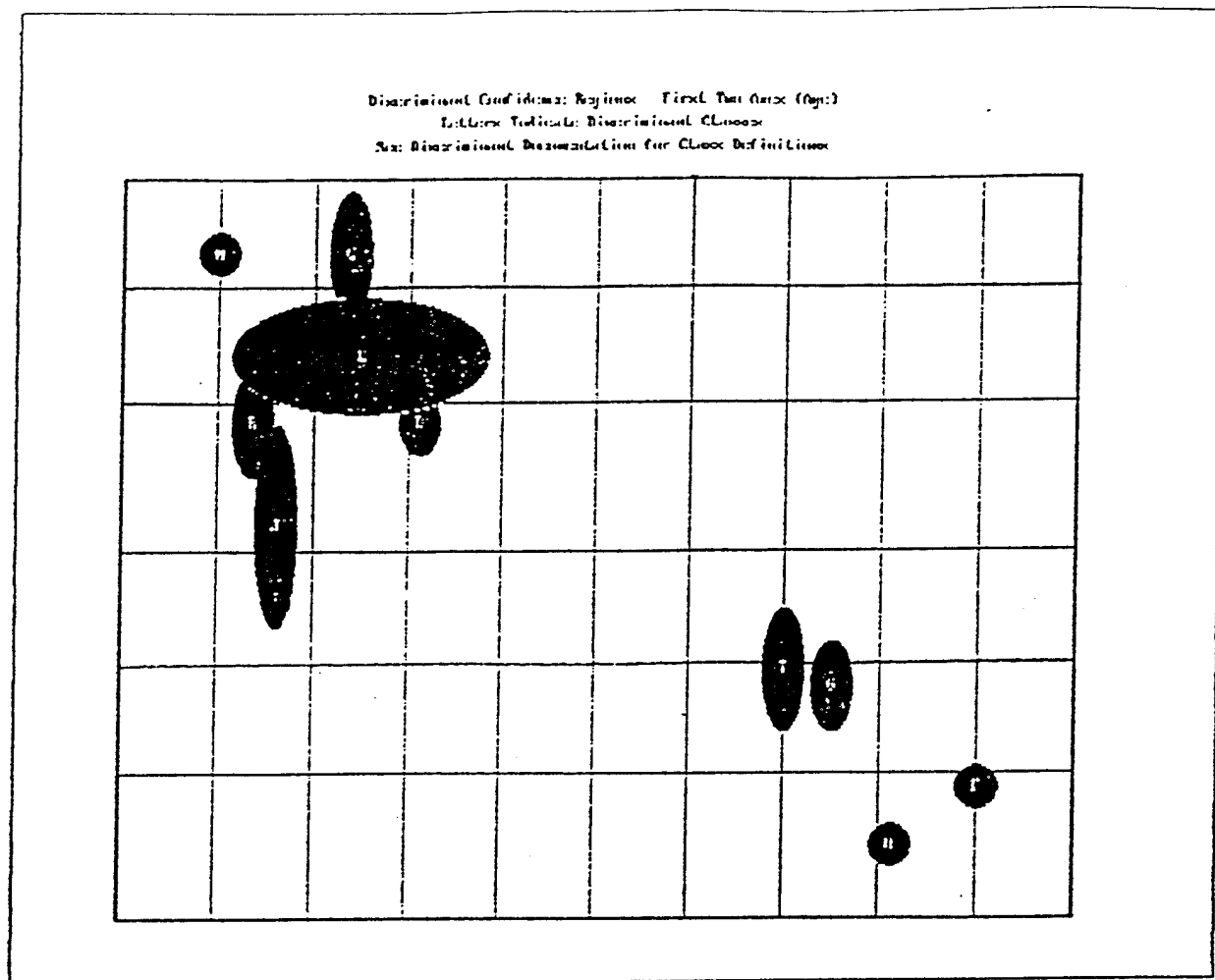
Figure 41. Multiple Discriminant Graphic Output.

4.7.4 Sample Allocation

When this option is selected, the dialog shown in Figure 42 appears.
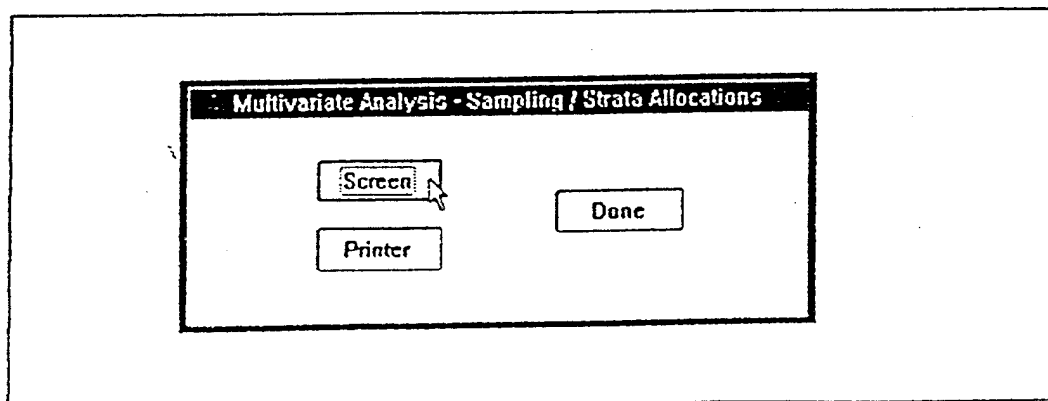
Figure 42. Sample Allocation Dialog.

45

TO VIEW SAMPLE STRATIFICATION AND ALLOCATION (Figures 43 and 44):

1. To display text report on screen. click "SCREEN".

2. To send text report to printer, click "PRINTER'.

3. To exit and return to Review Analysis Dialog, click "DONE".

```
                    STRATIFICATION RESULTS

          Data Set:  EMTEST - All Major
          Variable:  Rate
          ===============================

          8009-HM   ==   ==
          1500-RM   ==   ==
          1700-YN   ==   ==
          2000-SK   ==   ==
          1800-PN   ┐    ┐
          1600-CT   │    │   ┐
          8300-OT   │    │   │
          7300-AK   ┘    ┘   │   ┐
          1900-OP   ==   ┐   │   │
          7400-AZ   ┐    │   ┘   │
          6600-AC   │    │       │  ┐
          2100-OK   ┘    │       ┘  │
          7600-PH   ==   │          │
          0450-OT   ┐    │          │
          7100-AG   │    │          │
          1400-NC   │    │          │
          7200-TD   │    │          │
          2500-RP   │    │          │
          2600-JO   ┘    │          │
          1750-LN   ==   ┘          │
          3100-LI   ┐               │
          1200-OM   │               │
          3200-OM   │               │
          4500-DC   │               │
          1080-PI   ┘               ┘
          3600-SN   ┐    ┐
          7800-AN   │    │
          3700-MM   │    │
          5000-FN   │    │
          2200-MS   │    │
          6900-AM   │    │
             .      .    .
             .      .    .
             .      .    .
          5100-EA   │    │
          6180-AV   │    │
          4700-ML   │    │
          5380-EQ   │    │
          5080-CU   │    │
          5280-UC   ┘    ┘

          ===============================
```
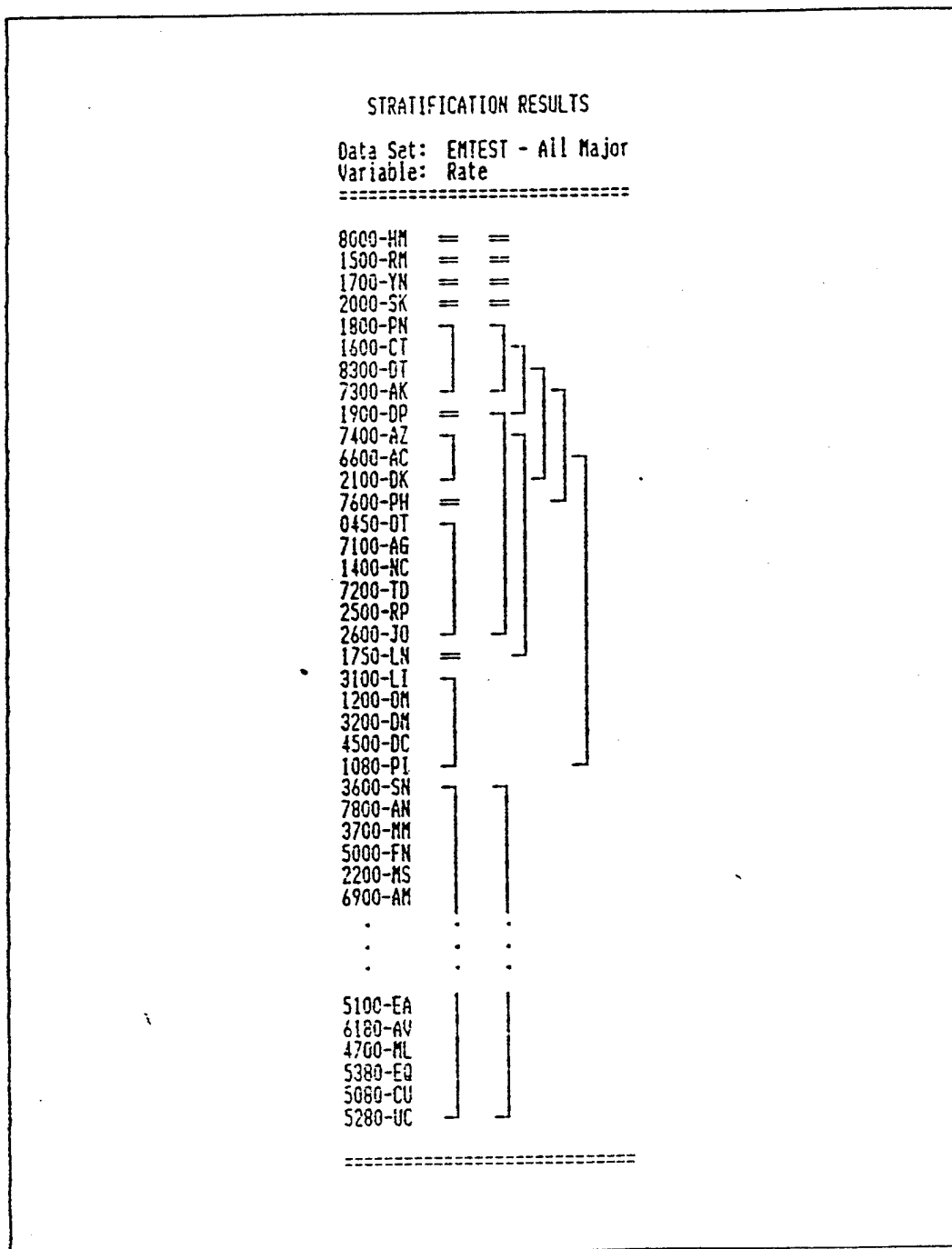
Figure 43. Sample Stratification.

46

MULTIPLE DISCRIMINANT ANALYSIS

Discriminant Data Set: TEST CASE - All Major
Ancillary Variable : Age
===

Discriminant Variable Classes

Class-A: Chladial Perinata	Class-E: Bacteria Blood	Class-I: Mental MusSkele	Class-M: Respirat Symptoms
Class-B: Worms	Class-F: SexTrans	Class-J: Digestiv Neoplasa CongAnom EnNuMeta	Class-N: PrgBirth
Class-C: Ricketts EctoPara	Class-G: Protozoa Fungus UnEtiol		Class-O: Viral Special
Class-D: Sprchete	Class-H: Mycobact Accident	Class-K: SkinSubc Circulat Class-L: NervSens	Class-P: GenUrina

===
Descriptive Statistics

Variable	Mean	Var(total)	Var(among)	Var(within)	Eigenvalue	% Var
17-19	3.7321e+03	5.4735e+08	3.2978e+07	4.0900e+06	4.9144e+02	94.62
20-21	3.3010e+03	4.3231e+08	2.5089e+07	2.9526e+08	2.2288e+01	4.29
22-24	3.1239e+03	3.7836e+08	2.0118e+07	2.0505e+08	3.1238e+00	0.60
25-29	2.7932e+03	3.0223e+08	1.4612e+07	1.2152e+08	1.2204e+00	0.23
30-34	1.5357e+03	9.3802e+07	4.3261e+06	3.1654e+07	8.1855e-01	0.15
35-39	1.0882e+03	4.5795e+07	2.1447e+06	1.6402e+07	3.8245e-01	0.07
40-44	4.0090e+02	5.4530e+06	3.0038e+05	3.2581e+06	9.4130e-02	0.01
45-61	1.5166e+02	7.8391e+05	4.8729e+04	6.2923e+05	6.0031e-03	0.00

===
Eigenvector Correlations

Variable   Correlations:

17-19	4.4229e-01	3.3958e-01	1.2569e-01	2.2788e-01	6.7382e-01	9.6599e-02
20-21	4.9309e-01	2.4843e-01	1.2594e-01	1.9809e-01	7.2760e-01	1.6719e-01
22-24	5.8298e-01	2.5664e-01	9.9209e-02	1.9318e-01	6.6682e-01	1.6834e-01
25-29	6.2899e-01	3.7353e-01	6.2497e-02	1.8521e-01	5.6876e-01	1.8431e-01
30-34	5.8036e-01	5.2923e-01	-2.3341e-02	2.3684e-01	4.6186e-01	2.1130e-01
35-39	4.8988e-01	5.8402e-01	-1.4626e-01	4.0776e-01	3.0387e-01	2.7203e-01
40-44	3.6238e-01	4.9926e-01	-1.7020e-01	5.8783e-01	1.6780e-01	3.4063e-01
45-61	2.5548e-01	3.9991e-01	-1.9509e-01	6.8612e-01	3.3648e-02	4.2633e-01

===
F-Tests for Ancillary Variables

Variable	F-Ratio	Probability
17-19	1.1598	0.60213647
20-21	1.2659	0.66399771
22-24	1.5993	0.79959242
25-29	2.1554	0.91406559 *
30-34	2.5622	0.95241429 *
35-39	2.4197	0.94139812 *
40-44	1.4505	0.74711517
45-61	1.0797	0.55067237

Numerator df: 15
Denominator df: 13

===

Figure 44. Sample Allocation Technical Text Report.

47

5.1 Overview

The univariate option performs analyses based on single NHRC major or minor categories or individual NHRC diagnosis/classification codes. Analyses include:

o   incidence frequencies tabulated by independent ancillary variables sex, race, age, branch, grade, occupation, duty platform, and ocean region.

o   frequency, rate, age-adjusted, and standard rate data summaries based on one-, two-, and three-level cross-tabulations of the independent ancillary variables listed above.

o   raw time series and spectral density analysis.

There are six sub-menu items under Univariate Analysis. Note that for a completely new univariate analysis, each menu item must be completed in order. If this is not done, unexpected results could occur. If an option is selected that requires the results of a previous analysis and that analysis has not been performed, a warning message appears with information on how to remedy the error. Each menu item is described in subsequent sections.

5.2 Select Univariate Options

See section 4.2 "Select Multivariate Options" for complete instructions.

5.3 Define Data Structure

See section 4.3 "Define Data Structure" for complete instructions.

5.4 Extract Data

See section 4.4 "Extract Data" for complete instructions.

5.5 Review Extraction

See section 4.5 "Review Extraction" for complete instructions.

5.6 Select Data Structure

When this item is selected, the dialog shown in Figure 45 appears. This dialog is used to select the data structure definition that will be used in the unmivariate data summary calculations.
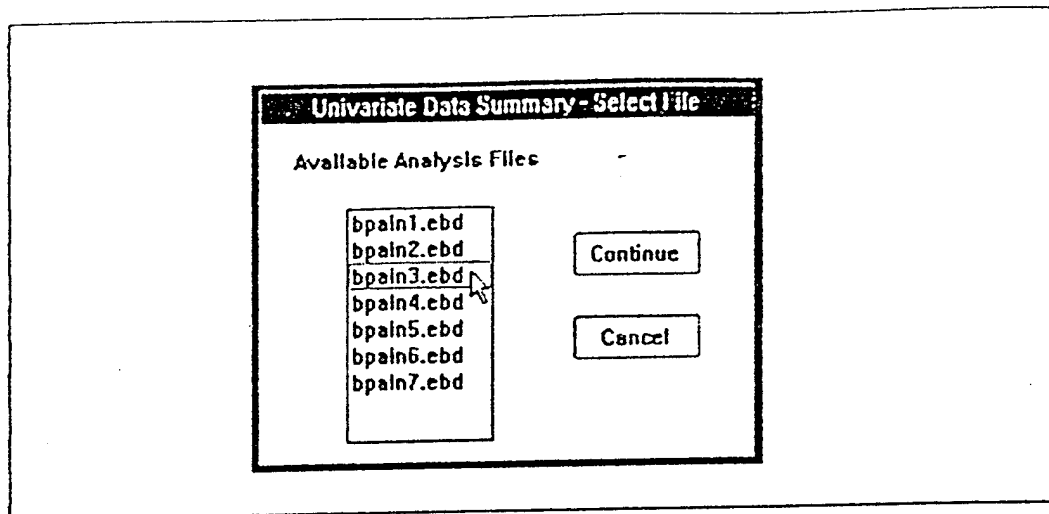
Figure 45. Select Data Definition Dialog.

TO SELECT AVAILABLE DATA STRUCTURE DEFINITION:

1. Select available definition according to instructions in section 1.7.

2. To accept and return to EPISYS Desktop, click "CONTINUE".

3. To reject and return to EPISYS Desktop, click "CANCEL".

5.7 Calculate Data Summary

When this item is selected, the dialog shown in Figure 46 appears.

TO CALCULATE DATA SUMMARY (Figure 47):

1. Select Independent variable effects according to the instructions in section 1.7.

2. Click "CALCULATE".

    The bar at the bottom of dialog tracks progress of calculations.

3. To view data summary on screen, click "SCREEN".

4. To send data summary to printer, click "PRINTER".

5. Repeat steps 1 through 4 as required.

6. To exit and return to EPISYS Desktop, click "DONE".

Figure 46. Data Summary Dialog.

```
                    UNIVARIATE DATA SUMMARY

                       Back Pain 66208

                 Number of Cases    :      5607
                 Person-Days at Risk:   4461376
                 Rate (per 100000)  :    125.679
```

		No of Cases	Per-Yrs at Risk	Incident Rate	Conf Limits (95%) Lower	Upper	Age Adjustment Totl Pop Rate	Expected Number	Standardized Incident Rate	Conf Limits (95%) Lower	Upper
Male	17-19	854	663739	128.67	120.04	137.29	133.32	885	0.965	0.904	1.026
	20-21	778	801304	97.09	90.27	103.91	99.98	801	0.971	0.907	1.035
	22-24	790	867520	91.06	84.72	97.41	94.27	818	0.966	0.903	1.028
	25-29	971	796444	121.92	114.25	129.58	123.12	981	0.990	0.931	1.049
	30-34	736	476938	154.32	143.18	165.46	156.26	745	0.988	0.919	1.056
	35-39	662	332471	199.12	183.96	214.27	202.89	675	0.981	0.908	1.054
	40-44	219	120245	182.13	158.03	206.23	181.98	219	1.000	0.869	1.131
	45-61	56	37047	151.16	111.60	190.72	149.31	55	1.018	0.752	1.285
	Total	5066	4095708	123.69	120.29	127.09	126.45	5179	0.978	0.952	1.005
Female	17-19	107	57087	187.43	151.95	222.91	133.32	76	1.408	1.319	1.497
	20-21	103	79854	128.99	104.09	153.88	99.98	80	1.288	1.203	1.372
	22-24	121	98889	122.36	100.57	144.15	94.27	93	1.301	1.217	1.386
	25-29	114	84782	134.46	109.80	159.13	123.12	104	1.096	1.031	1.161
	30-34	62	33750	183.70	138.02	229.39	156.26	53	1.170	1.089	1.251
	35-39	31	9101	340.62	220.92	460.33	202.89	18	1.722	1.594	1.850
	40-44	3	1747	171.72	0.00	365.88	181.98	3	1.000	0.869	1.131
	45-61	0	458	0.00	0.00	0.00	149.31	1	0.000	0.000	0.000
	Total	541	365668	147.95	135.49	160.41	117.05	428	1.264	1.144	1.384
Total		5607	4461376	125.68	122.39	128.97	125.68	5607	1.000	0.974	1.026

Figure 47.   Data Summary Text Report.

51

6.0 LIMITS OPTION

6.1 Overview

The limits item performs moving average limit detection analyses on each NHRC major and minor category. The purpose of the analyses is to define time intervals during which the moving average for any category moves outside of local or global confidence limits.

There are two sub-menu items under Limits Analysis. Note that, whenever the CDF file has newly installed or updated, the first item (Perform Analysis) must be performed before the second item (Review Results) can be selected. If the second item is chosen prematurely, a warning message appears with information on how to remedy the error. Both menu items are described in subsequent sections.

6.2 Perform Analysis

When this item is selected, the dialog shown in Figure 48 appears.
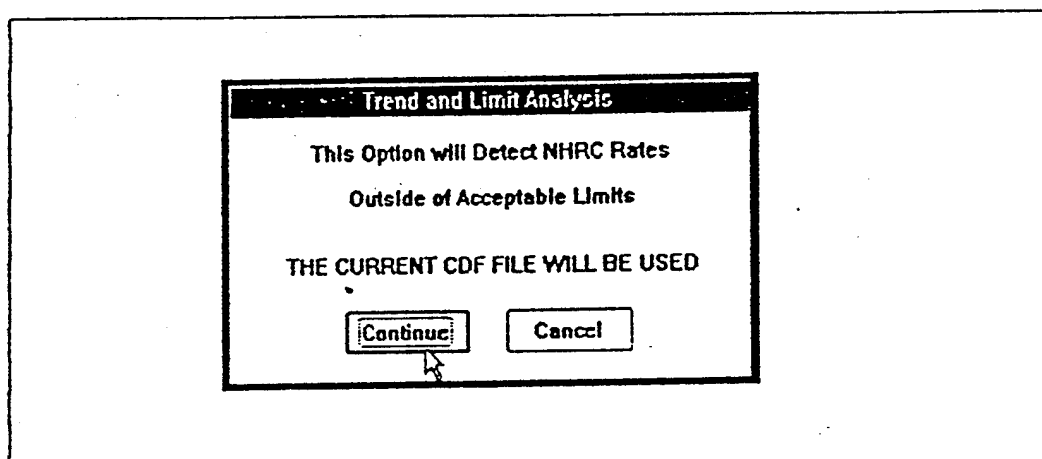
Figure 48. Perform Analysis Dialog.

__TO PERFORM LIMITS ANALYSIS__:

1. To perform analysis, click "CONTINUE".

2. To abort and return to EPISYS Desktop, click "CANCEL".

   During the analysis, a screen appears that tracks progress of the analysis.

6.3 Review Results

When this option is selected, the dialog shown in Figure 49 appears.

52
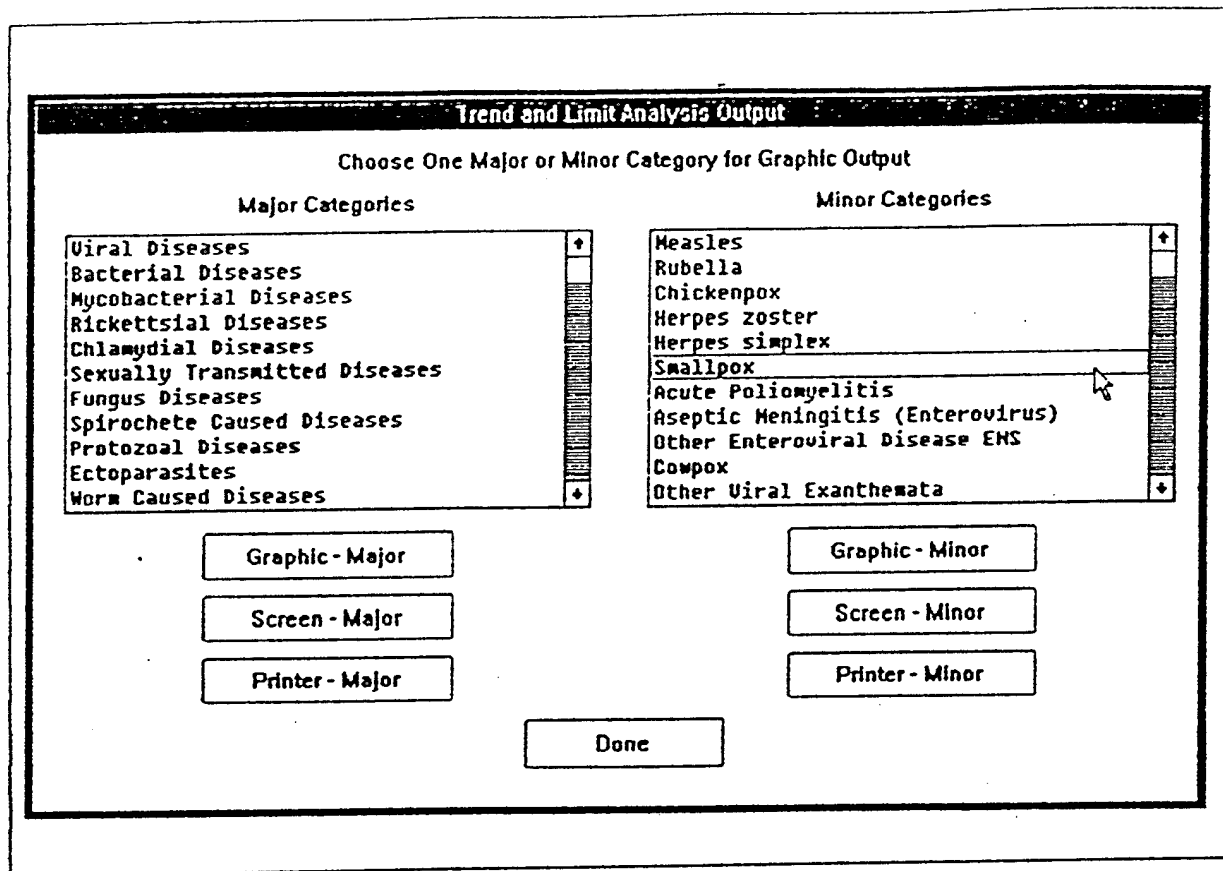
Figure 49. Review Analysis Dialog.

TO VIEW TEXT REPORTS (Figure 50):

1. For text report on major categories:

    1a. To display report on screen, click "SCREEN-MAJOR".

    1b. To send report to printer, click "PRINTER-MAJOR".

2. For text report on minor categories:

    2a. To display report on screen, click "SCREEN-MINOR".

    2b. To send report to printer, click "PRINTER-MINOR".

```
============================================================================

                           Viral Diseases

--------------------------------------------------------------------------
     Feb 1982    BELOW Local    Confidence Region        -4.7632
     Mar 1982    BELOW Local    Confidence Region        -7.3240
     Apr 1982    BELOW Local    Confidence Region       -11.1754
     May 1982    BELOW Local    Confidence Region        -3.0575
     Jan 1983    BELOW Local    Confidence Region        -1.4866
     Feb 1983    BELOW Local    Confidence Region        -6.8045
     Mar 1983    BELOW Local    Confidence Region        -9.3473
     Apr 1983    BELOW Local    Confidence Region       -13.3125
     May 1983    BELOW Local    Confidence Region       -14.5254
     Jun 1983    BELOW Local    Confidence Region       -13.5167
     Apr 1985    BELOW Overall  Confidence Region        -0.9782
     Sep 1986    ABOVE Overall  Confidence Region        11.0334
     Oct 1986    ABOVE Overall  Confidence Region         4.6295
============================================================================

                         Bacterial Diseases

--------------------------------------------------------------------------
     Nov 1984    ABOVE Overall  Confidence Region         0.5860
     Dec 1984    ABOVE Overall  Confidence Region         3.0793
     Jan 1985    ABOVE Overall  Confidence Region         2.6406
     Feb 1985    ABOVE Overall  Confidence Region         4.2425
     Mar 1985    ABOVE Overall  Confidence Region         3.9026
     Apr 1985    ABOVE Overall  Confidence Region         2.8977
     May 1985    ABOVE Overall  Confidence Region         1.2249
     Jun 1985    ABOVE Overall  Confidence Region         1.2354
============================================================================

                      Mycobacterial Diseases

--------------------------------------------------------------------------
     Jan 1982    BELOW Overall  Confidence Region        -0.3454
     Feb 1982    BELOW Overall  Confidence Region        -0.2691
     Apr 1982    BELOW Overall  Confidence Region        -0.0209
     Dec 1985    ABOVE Local    Confidence Region         0.7971
     Jan 1986    ABOVE Local    Confidence Region         1.0772
     Feb 1986    ABOVE Local    Confidence Region         1.5896
     Mar 1986    ABOVE Local    Confidence Region         1.1977
     Apr 1986    ABOVE Local    Confidence Region         0.8874
     May 1986    ABOVE Local    Confidence Region         0.5043
     Jun 1986    ABOVE Local    Confidence Region         0.3586
     Jul 1986    ABOVE Local    Confidence Region         0.4329
     Aug 1986    ABOVE Local    Confidence Region         0.3437
     Sep 1986    ABOVE Local    Confidence Region         0.2437
     Oct 1986    ABOVE Local    Confidence Region         0.0034
============================================================================

                        Rickettsial Diseases

--------------------------------------------------------------------------

              Cannot Analyze - only 22 Occurrences

============================================================================
```

Figure 50. Limits Text Report.

54

<u>TO VIEW GRAPHIC OUTPUT (Figure 51)</u>:

1. For graphics on major category:

    1a. Select major category according to instructions in section 1.7.

    1b. Click "GRAPHIC-MAJOR".

2. For graphics on minor category:

    2a. Select minor category according to instructions in section 1.7.

    2b. Click "GRAPHIC-MINOR".

3. To exit and return to EPISYS Desktop, click "DONE".
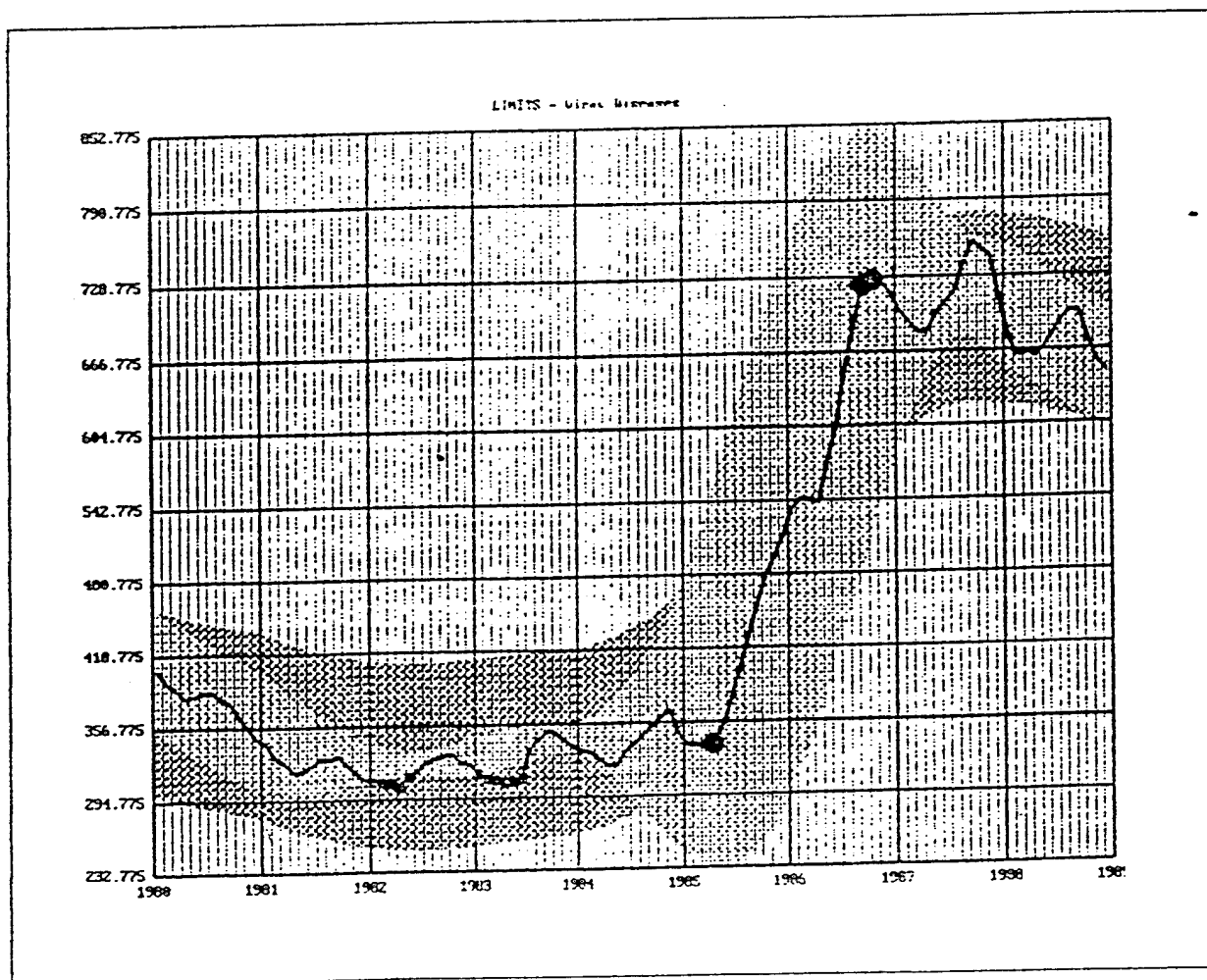
Figure 51. Limits Graphic Output.

TECHNICAL REFERENCE

The EPISYS Technical Reference is a roadmap to the entire system. It is divided into three sections: (1) variable and code definitions, (2) menu and executable module definitions and file dependencies, and (3) CDF File formats. The Technical Reference is intended to function as an aid to system use and maintenance.

R.1   Variable and Code Definitions

R.1.1   Dependent Variable - NHRC Major Disease Category

Code	Label	Descriptive Name
1	Viral	Viral Diseases
2	Bacteria	Bacterial Diseases
3	Mycobact	Mycobacterial Diseases
4	Ricketts	Rickettsial Diseases
5	Chlmdial	Chlamydial Diseases
6	SexTrans	Sexually Transmitted Diseases
7	Fungus	Fungus Diseases
8	Sprchete	Spirochete Caused Diseases
9	Protozoa	Protozoal Diseases
10	EctoPara	Ectoparasites
11	Worms	Worm Caused Diseases
12	UnEtiol	Uncertain Etiology
13	Neoplasm	Neoplasms
14	EnNuMeta	Endocrine/Nutrition/Metabolic Diseases
15	Blood	Diseases of Blood/Blood-Forming Organs
16	Mental	Mental Disorders
17	NervSens	Diseases of Nervous System/Sense Organs
18	Circulat	Diseases of Circulatory System
19	Respirat	Diseases of Respiratory System
20	Digestiv	Diseases of Digestive System
21	GenUrina	Diseases of Genitourinary System
22	PrgBirth	Complications of Pregnancy/Childbirth
23	SkinSubc	Diseases of Skin/Subcutaneous Tissue
24	MusSkele	Diseases of Muscoloskeletal System
25	CongAnom	Congenital Anamolies
26	Perinata	Perinatal Morbidity/Mortality
27	Symptoms	Symptomatic/Ill-Defined Conditions
28	Accident	Accident/Poisoning/Violence
29	Special	Supplementary/Special Conditions

1

R.1.2 Dependent Variable – NHRC Minor Disease Category

Major Code	Minor Code	Label	Descriptive Name
1	48	Measles	Measles
1	49	Rubella	Rubella
1	45	Chickpox	Chickenpox
1	46	Herpesz	Herpes zoster
1	47	Herpess	Herpes simplex
1	43	Smallpox	Smallpox
1	40	PolioAct	Acute Poliomyelitis
1	41	Menigiti	Aseptic Meningitis (Enterovirus)
1	42	ViralENS	Other Enteroviral Disease ENS
1	44	Cowpox	Cowpox
1	50	VirExOth	Other Viral Exanthemata
1	51	YellwFev	Yellow Fever
1	52	Dengue	Dengue
1	53	EnceMosq	Mosquito-Borne Viral Encephalitis
1	54	EnceTick	Tick-Borne Viral Encephalitis
1	55	EnceUnsp	Unspec Arthropod-Borne Encephalitis
1	56	EnceEpid	Acute Encephalitis Epidemic
1	57	EnceVirl	Viral Encephalitis
1	58	HemoArth	Arthropod-Borne Hemorrhagic Fever
1	59	HemoEpid	Epidemic Hemorrhagic Fever
1	60	ArthOther	Other Arthropod-Borne
1	61	HepatVir	Viral Hepatitis
1	62	Rabies	Rabies
1	63	Mumps	Mumps
1	65	Coxsacki	Coxsackie Virus Disease
1	66	Mononucl	Infectious Mononucleosis
1	68	ConjVirl	Other Viral Disease Conjunctiva
1	69	VirOther	Other Viral Disease
2	1	Cholera	Cholera
2	2	Typhoid	Typhoid Fever
2	3	ParaTyph	Paratyphoid Fever
2	4	SalmOthr	Other Salmonella Infection
2	5	DysenBac	Bacillary Dysentary
2	6	BactFood	Food Poisoning (Bacterial)
2	10	Diarrhea	Diarrheal Disease
2	22	Plague	Plague
2	23	Tularemi	Tularemia
2	24	Anthrax	Anthrax
2	25	Brucello	Brucellosis
2	26	Glanders	Glanders
2	27	Melioido	Melioidosis
2	28	FeverRat	Rat-Bite Fever
2	29	ZBactOth	Other Zoonotic Bacterial Disease
2	30	Leprosy	Leprosy
2	32	Diphther	Diphtheria
2	33	Whooping	Whooping Cough

2

Major Code	Minor Code	Label	Descriptive Name
2	34	Streptoc	Streptococcal Sore Throat/Scarlet Fever
2	35	Erysipel	Erysipelas
2	36	Mencocca	Meningococcal Infection
2	37	Tetanus	Tetanus
2	38	Septicem	Septicemia
2	39	Bacteria	Other Bacterial Disease
3	12	TBPulmon	Tuberculosis Pulmonary
3	13	TBRespir	Tuberculosis Other Respiratory
3	14	TBMenigi	Tuberculosis Meniges CNS
3	15	TBIntest	Tuberculosis Intestine/Peritoneum/Mesenteric
3	16	TBBones	Tuberculosis Bones and Joints
3	17	TBGenuri	Tuberculosis Genitourinary System
3	18	TBOther	Tuberculosis Other Organs
3	19	TBDissem	Tuberculosis Disseminated
3	20	TBLate	Tuberculosis Late Effects
3	21	TBUnspec	Tuberculosis Unspec Site
3	31	MycoOthr	Other Mycobacterial Disease
4	72	RickTick	Tick-Borne Rickettsiosis
4	64	Psittaco	Psittacosis
4	73	RickOthr	Other Rickettsiosis
4	70	TyphLous	Louse-Borne Typhus
5	67	Trachoma	Trachoma
6	80	SyphCong	Syphilis Congenital
6	81	SyphSymp	Syphilis Early Symtomatic
6	82	SyphLtnt	Syphilis Early Latent
6	83	SyphCVas	Syphilis Cardiovascular
6	84	SyphCNS	Syphilis CNS
6	85	SyphUnsp	Syphilis Other and Unspec
6	86	Syphothr	Syphilis
6	87	Gonococc	Gonococcal Infection
6	88	VenOther	Other Venereal Disease
6	113	TrichUro	Urogenital Trichomoniasis
7	94	Dermatop	Dermatophytosis
7	95	DermUnsp	Dermatophytosis Other and Unspec
7	96	Monilias	Moniliasis
7	97	Actinomy	Actinomycosis
7	98	Coccidio	Coccidiomycosis
7	100	Blastomy	Blastomycosis
7	101	MycoOthr	Other Mycosis
8	78	RelaspFe	Relapsing Fever
8	89	Leptospi	Leptospirosis
8	90	AnginaVi	Vincents Angina
8	91	Yaws	Yaws
8	92	Pinta	Pinta
8	93	SpirOthr	Other Spirochete Infection
9	74	Malaria	Malaria

3

Major Code	Minor Code	Label	Descriptive Name
9	75	Leischma	Leischmaniasis
9	76	TrypAmer	American Trypanosomiasis
9	77	TrypOthr	Other Trypanosomiasis
9	112	Toxoplas	Toxoplasmosis
9	7	Amebiasi	Amebiasis
9	8	ProtOthr	Other Protozoal Intestinal Disease
10	114	Pediculo	Pediculosis
10	115	Acariasi	Acariasis
10	116	InfOther	Other Infestation
10	117	ArthOthr	Other Arthropod Infestation
11	102	Schistos	Schistosomiasis
11	103	TremOthr	Other Trematode Infection
11	104	Hydatido	Hydatidosis
11	105	CestOthr	Other Cestode Infection
11	106	Trichini	Trichiniasis
11	107	Filarial	Filarial Infection
11	108	Ancylost	Ancylostomiasis
11	109	HelmOthr	Other Intestinal Helminthiasis
11	110	HelmUnsp	Other and Unspec Helminthiasis
11	111	ParaUnsp	Unspec Intestinal Parasitism
12	118	Sarcoido	Sarcoidosis
13	1002	Neoplasm	Neoplasm
14	1003	EnNuMeta	Endocrine/Nutrition/Metabolic
15	1004	Blood	Blood/Blood-Forming Organs
16	1005	Mental	Mental Disorder
17	1006	NervSens	Nervous System/Sense Organs
18	1007	Circulat	Circulatory System
19	1008	Respirat	Respiratory System
20	1009	Digestiv	Digestive System
21	1010	GenUrina	Genitourinary System
22	1011	PrgBirth	Pregnancy/Childbirth
23	1012	SkinSubc	Skin/Subcutaneous Tissue
24	1013	MusSkele	Muscoloskeletal System
25	1014	CongAnom	Congenital Anamoly
26	1015	Perinata	Perinatal Morbidity/Mortality
27	1016	Symptoms	Symptomatic/Ill-Defined
28	1017	Accident	Accident/Poisoning/Violence
29	1018	Special	Supplementary/Special

4

R.1.3   Dependent Variable - Month of the Year

Code	Label	Descriptive Name
1	Jan	January
2	Feb	February
3	Mar	March
4	Apr	April
5	May	May
6	Jun	Jun
7	Jul	July
8	Aug	August
9	Sep	September
10	Oct	October
11	Nov	November
12	Dec	December

R.1.4   Independent Variable - Sex

Code	Label	Descriptive Name
1	Male	Male
2	Female	Female

R.1.5   Independent Variable - Race

Code	Label	Descriptive Name
1	White	White/Caucasian
2	Black	Black/Negroid
3	Other	Other/Unspec

R.1.6   Independent Variable - Standard Age Class

Code	Start Age	End Age	Code	Start Age	End Age
1	17	19	5	30	34
2	20	21	6	35	39
3	22	24	7	40	44
4	25	29	8	45	61

R.1.7   Independent Variable - Service Branch

Code	Label	Descriptive Name
1	USN	US Navy
2	USMC	US Marine Corps

5

R.1.8   Independent Variable - Pay Grade

Code	Label	Descriptive Name
1	Officer	Officer
2	Enlisted	Enlisted

R.1.9   Independent Variable - Occupation Rate

Code	Label	Descriptive Name
1	0100-BM	0100-BM - Boatswains Mate
2	0150-MA	0150-MA - Master-at-Arms
3	0200-QM	0200-QM - Quartermaster
4	0250-SM	0250-SM - Signalman
5	0300-OS	0300-OS - Operations Spec
6	0350-EW	0350-EW - Electronics Warfare
7	0400-ST	0400-ST - Sonar Tech
8	0450-OT	0450-OT - Ocean Systems Tech
9	0500-TM	0500-TM - Torpedomans Mate
10	0600-GM	0600-GM - Gunners Mate
11	0610-WT	0610-WT - Weapons Tech
12	0700-FC	0700-FC - Fire Controlman
13	0800-FT	0800-FT - Fire Control Tech
14	0810-MT	0810-MT - Missile Tech
15	0900-MN	0900-MN - Mineman
16	1000-ET	1000-ET - Electronics Tech
17	1010-DS	1010-DS - Data Systems Tech
18	1080-PI	1080-PI - Precision Instrumentman
19	1100-IM	1100-IM - Instrumentman
20	1200-OM	1200-OM - Opticalman
21	1400-NC	1400-NC - Navy Counselor
22	1500-RM	1500-RM - Radioman
23	1600-CT	1600-CT - Communications Tech
24	1700-YN	1700-YN - Yeoman
25	1750-LN	1750-LN - Legalman
26	1800-PN	1800-PN - Personnelman
27	1900-DP	1900-DP - Data Processing Tech
28	2000-SK	2000-SK - Storekeeper
29	2100-DK	2100-DK - Disbursing Clerk
30	2200-MS	2200-MS - Mess Management Spec
31	2300-IS	2300-IS - Intelligence Spec
32	2490-SH	2490-SH - Ships Serviceman
33	2500-RP	2500-RP - Religious Program
34	2600-JO	2600-JO - Journalist
35	2700-PC	2700-PC - Postal Clerk
36	3100-LI	3100-LI - Lithographer
37	3200-DM	3200-DM - Illustrator Draftsman
38	3300-MU	3300-MU - Musician
39	3600-SN	3600-SN - Seaman

6

Occupation Rate (continued)

Code	Label	Descriptive Name
40	3700-MM	3700-MM – Machinists Mate
41	3800-EN	3800-EN – Engineman
42	3900-MR	3900-MR – Machinery Repairman
43	4000-BT	4000-BT – Boiler Tech
44	4100-EM	4100-EM – Electricians Mate
45	4200-IC	4200-IC – Interior Comm Electrician
46	4300-HT	4300-HT – Hull Maintenance Tech
47	4400-GS	4400-GS – Gas Turbine Systems Tech
48	4500-DC	4500-DC – Damage Controlman
49	4700-ML	4700-ML – Molder
50	5000-FN	5000-FN – Fireman
51	5080-CU	5080-CU – Contructionman
52	5100-EA	5100-EA – Engineering Aid
53	5280-UC	5280-UC – Utilities Constructionman
54	5300-CE	5300-CE – Construction Electrician
55	5380-EQ	5380-EQ – Equipmentman
56	5500-CM	5500-CM – Construction Mechanic
57	5600-BU	5600-BU – Builder
58	5700-SW	5700-SW – Steelworker
59	5800-UT	5800-UT – Utilitiesman
60	6000-CN	6000-CN – Constructionman
61	6080-AF	6080-AF – Aircraft Maintenance Tech
62	6180-AV	6180-AV – Avionics Tech
63	6200-AD	6200-AD – Aviation Machinists Mate
64	6300-AT	6300-AT – Aviation Electrons Tech
65	6310-AX	6310-AX – ASW Tech
66	6400-AW	6400-AW – Aviation ASW Operator
67	6500-AO	6500-AO – Aviation Ordnanceman
68	6600-AC	6600-AC – Air Controlman
69	6700-AB	6700-AB – Aviation Boatswains Mate
70	6800-AE	6800-AE – Aviation Electricians Mate
71	6900-AM	6900-AM – Aviation Structural Mech
72	7000-PR	7000-PR – Aircrew Survival Equipmentman
73	7100-AG	7100-AG – Aerographers Mate
74	7200-TD	7200-TD – Trademan
75	7300-AK	7300-AK – Aviation Storekeeper
76	7400-AZ	7400-AZ – Aviation Maintenance Adminman
77	7500-AS	7500-AS – Aviation Support Equip Tech
78	7600-PH	7600-PH – Photographers Mate
79	7700-PT	7700-PT – Photographic Intelligenceman
80	7800-AN	7800-AN – Airman
81	8000-HM	8000-HM – Hospital Corpsman
82	8300-DT	8300-DT – Dental Tech
83	9999-ZZ	9999-ZZ – Other

7

2.2 Menus

Each main menu item (except QUIT) selects a major EPISYS module. The following defines the purpose of each module:

Episys: System initialization on first-time start and displays EPISYS logo screen. In a future update, this will be the entry point into the help system.

Multivariate: Analysis of multiple simultaneous dependent variables: NHRC codes and month-of-the-year. NHRC codes may be individual 5-digit NHRC codes, one of 29 major NHRC categories, or one of 130 minor NHRC categories (see the Technical Reference for definitions of major and minor categories). Independent ancillary variables are analyzed for their effects on the dependent variables; these include sex, race, age, branch, grade, occupation, platform and ocean region. Sampling stratification and size allocation is also included.

Univariate: Analysis of single dependent NHRC codes or major or minor NHRC categories. Frequencies and rates are calculated as well as age-adjusted and standardized rate summaries. Raw time series and spectral density analyses are produced.

Limits: A screening module, designed to be run each time the CDF file is updated. Produces time series graphics and written reports indicating time periods when major or minor NHRC category rates exceed local or global confidence limits.

Quit: Safe option for exiting EPISYS. Returns control to WINDOWS.

8

R.1.11 Independent Variable - Ocean Region

Code	Label	Descriptive Name
1	A1-Altnw	A1 - Atlantic Ocean, Northwest
2	A2-Arct	A2 - Arctic Ocean
3	A3-Carr	A3 - Caribbean Sea and Gulf of Mexico
4	A4-Atls	A4 - Atlantic Ocean, South
5	A5-Atlne	A5 - Atlantic Ocean, Northeast
6	A6-Med	A6 - Mediterannean Sea
7	A7-Pers	A7 - Persian Gulf and Red Sea
8	P1-Pacne	P1 - Pacific Ocean, Northeast
9	P2-Pacc	P2 - Pacific Ocean, Central
10	P3-Ber	P3 - Bering Sea
11	P4-Pacw	P4 - Pacific Ocean, West
12	P5-Pacse	P5 - Pacific Ocean, Southeast
13	P6-Ind	P6 - Indian Ocean
14	P7-Ant	P7 - Antarctic Ocean

R.2 Executable Modules

9

R.2.1 Executable Module Dependencies

Main Menu	Sub-Menus	Executable Modules

EpiSys   -) About EpiSys   -) EPILOGO
         -) Run EpiSys Preparation -) EPPRP

Multivariate   -) Select Multivariate Options -) EMOPT
         -) Define Data Structure   -) EMDEF -) EBICD -) EBMAJ
                                                         -) EBMIN
                                                          -) EBCDE

                                         -) EBSEX
                                         -) EBRCE -) EBIRC
                                         -) EBAGE -) EBIAG
                                         -) EBBRN
                                         -) EBGRD
                                         -) EBRTE -) EBIRT
                                         -) EBPLT -) EBIPL
                                         -) EBOCN -) EBIOC
                                                          -) OCNPLT

                                         -) EBDEN
                                         -) EBDTE
         -) Extract Data   -) EMEXT -) EBEXTRCT
         -) Review Extraction   -) EMOUT -) TIMEPLT
                                         -) SPCTPLT

         -) Perform Analysis   -) EMANA -) EMEXEC -) CLSTPRP
                                                             -) CLSTPRN
                                                             -) DISCPRP1
                                                             -) DISCPRP2
                                                             -) DISCRIM
                                                             -) DSTRATA
                                                             -) VSTRATA
                                                             -) TWTPRN1
                                                             -) TWTPRN2

         -) Review Analysis   -) ESOUT -) ESCLS -) CLSTPLT
                                               -) ESTWT -) TWTPLT1
                                                             -) TWTPLT2
                                             -) ESMDA -) DISCPLT
                                             -) ESSAM

Univariate   -) Select Univariate Options -) EUOPT
         -) Define Data Structure   -) EUDEF -) EBICD -) EBMAJ
                                                         -) EBMIN
                                                         -) EBCDE

                                         -) EBSEX
                                         -) EBRCE -) EBIRC
                                         -) EBAGE -) EBIAG
                                         -) EBBRN
                                         -) EBGRD
                                         -) EBRTE -) EBIRT
                                         -) EBPLT -) EBIPL
                                         -) EBOCN -) EBIOC
                                                          -) OCNPLT

                                         -) EBDEN
                                         -) EBDTE
         -) Extract Data   -) EUEXT -) EBEXTRCT
         -) Review Extraction   -) EUOUT -) TIMEPLT
                                         -) SPCTPLT

         -) Select Data Structure   -) EUDSF
         -) Calculate Data Summary   -) EUDSQ

Limits   -) Perform Analysis   -) ELANA -) ELEXEC -) ELIMPRP1
                                                             -) ELIMPRP2
                                                             -) ELIMANA1
                                                             -) ELIMANA2

         -) Review Results   -) ELOUT -) ELIMPLT1
                                               -) ELIMPLT2

10

R.2.2   Executable Module Descriptions

EPILOGO.EXE – DOS / Displays Startup-Logo Screen

INPUT: epilogo.pcx

EPPRP.EXE – WIN / Initialization

RUN   INPUT: epimaj.cde   OUTPUT: ebimaj.tbl ebirce.tbl
CANCEL   epimin.cde   ebtmaj.tbl episys.ctl
OK   epirte.cde   ebimin.tbl
                         epiplt.cde   ebirte.tbl
                         epiocn.cde   ebiplt.tbl
                         epirce.cde   ebiocn.tbl

EMOPT.EXE – WIN / Set Multivariate Options

TYPE1   INPUT: episys.ctl   OUTPUT: episys.ctl
MNDEV
SCALE0
  :
SCALE5
CANCEL
DONE

EMDEF.EXE – WIN / Control Data Structure Definition

ICD -> ebicd.exe   INPUT: eblist.tmp   OUTPUT: eblist.tmp
SEX -> ebsex.exe   ebimaj.tmp   ebimaj.tmp
RCE -> ebrce.exe   ebimin.tmp   ebimin.tmp
AGE -> ebage.exe   ebicde.tmp   ebicde.tmp
BRN -> ebbrn.exe   ebirce.tmp   ebirce.tmp
RTE -> ebrte.exe   ebiage.tmp   ebiage.tmp
GRD -> ebgrd.exe   ebirte.tmp   ebirte.tmp
PLT -> ebplt.exe   ebiplt.tmp   ebiplt.tmp
OCN -> ebocn.exe   ebiocn.tmp   ebiocn.tmp
DEN -> ebden.exe   episys.ctl   episys.ctl
DTE -> ebdte.exe   *.ebc   *.ebc
NEW
OPEN
SAVE
SAVEAS
ACCEPTFILE
CANCELFILE
RUN
CANCEL
DONE
FILE
SFILE
MAINLABEL

11

EBICD.EXE - WIN / Control Selection of NHRC Categories/Codes

```
   ALLMAJ            INPUT:  eblist.tmp      OUTPUT:  eblist.tmp
   ALLMIN
   INDMAJ -> ebmaj.exe
   INDMIN -> ebmin.exe
   NHRC   -> ebcde.exe
   RUN
   CANCEL
   DONE
```

EBMAJ.EXE - WIN / Select Major Categories

```
   SELECT            INPUT:  ebimaj.tmp      OUTPUT:  ebimaj.tmp
   CANCEL                    ebimaj.tbl
   DONE
```

EBMIN.EXE - WIN / Select Minor Categories

```
   SELECT            INPUT:  ebimin.tmp      OUTPUT:  ebimin.tmp
   CANCEL                    ebimin.tbl
   DONE                      ebtmaj.tmp
```

EBCDE.EXE - WIN / Select Individual NHRC Codes

```
   EBCDE01           INPUT:  ebicde.tmp      OUTPUT:  ebicde.tmp

     .
     .
     .
   EBCDE20
   CANCEL
   DONE
```

EBSEX.EXE - WIN / Select Sex Categories

```
   SEPARATE          INPUT:  eblist.tmp      OUTPUT:  eblist.tmp
   MALE
   FEMALE
   COMBINED
   CANCEL
   DONE
```

EBRCE.EXE - WIN / Select Race Categorie

```
   SEPARATE                  INPUT:  eblist.tmp    OUTPUT:  eblist.tmp
   INDRCE  -> ebirc.exe
   COMBINED
   RUN
   CANCEL
   DONE
```

12

EBIRC.EXE - WIN / Select Individual Race Categories

```
  SELECT           INPUT:   ebirce.tmp      OUTPUT:   ebirce.tmp
  CANCEL                    ebirce.tbl          -
  DONE
```

EBAGE.EXE - WIN / Control Selection of Age Classes

```
  STANDARD                  INPUT:  eblist.tmp    OUTPUT:  eblist.tmp
  NONSTAND -> ebiag.exe
  COMBINED
  RUN
  CANCEL
  DONE
```

EBIAG.EXE - WIN / Select Non-Standard Age Classes

```
  STRT01           INPUT:   ebiag.tmp      OUTPUT:   ebiag.tmp
   :
  STRT12
  STOPLST
  STOP01
   :
  STOP12
  ACCEPT
  CANCEL
  DONE
```

EBBRN.EXE - WIN / Select Service Branch Categories

```
  SEPARATE         INPUT:   eblist.tmp      OUTPUT:   eblist.tmp
  NAVY
  MARINE
  COMBINED
  CANCEL
  DONE
```

EBGRD.EXE - WIN / Select Grade Categories

```
  SEPARATE         INPUT:   eblist.tmp      OUTPUT:   eblist.tmp
  ENLISTED
  OFFICER
  COMBINED
  CANCEL
  DONE
```

13

EBRTE.EXE - WIN / Select Occupation Rates

```
    SEPARATE                  INPUT:  eblist.tmp    OUTPUT:  eblist.tmp
    INDRTE   -> ebirt.exe                  -
    COMBINED
    RUN
    CANCEL
    DONE
```

EBIRT.EXE - WIN / Select Individual Occupation Rates

```
    SELECT           INPUT:  ebirte.tmp      OUTPUT:  ebirte.tmp
    CANCEL                   ebirte.tbl
    DONE
```

EBPLT.EXE - WIN / Select Duty Platforms

```
    SEPARATE                  INPUT:  eblist.tmp    OUTPUT:  eblist.tmp
    INDPLT   -> ebipl.exe
    COMBINED
    RUN
    CANCEL
    DONE
```

EBIPL.EXE - WIN / Select Individual Duty Plarforms

```
    SELECT           INPUT:  ebiplt.tmp      OUTPUT:  ebiplt.tmp
    CANCEL                   ebiplt.tbl
    DONE
```

EBOCN.EXE - WIN / Select Individual Ocean Regions

```
    SEPARATE                  INPUT:  eblist.tmp    OUTPUT:  eblist.tmp
    INDOCN   -> ebioc.exe
    COMBINED
    RUN
    CANCEL
    DONE
```

EBIOC.EXE - WIN / Select Individual Ocean Regions

```
    SELECT          INPUT:  ebiocn.tmp      OUTPUT:  ebiocn.tmp
    CANCEL                  ebiocn.tbl
    DONE
    SHOWOCN -> ocnplt.exe
```

OCNPLT.EXE - DOS / Interactive Utility to Delineate Ocean Regions

```
                    INPUT:  oceans.pcx
                            oceans.pal
```

14

EBDEN.EXE - WIN / Select Type of Denominator Calculation

```
    TOTALS          INPUT:  eblist.tmp     OUTPUT:  eblist.tmp
    RATES                                     -
    CANCEL
    DONE
```

EBDTE.EXE - WIN / Select Inclusive Dates

```
    START           INPUT:  eblist.tmp     OUTPUT:  eblist.tmp
    STOP
    CANCEL
    DONE
```

EMEXT.EXE - WIN / Control Data Extraction

```
    EMCFILE              INPUT:          OUTPUT:  ebext.tmp
    RUN      -> ebextrct.exe
    CANCEL
```

EBEXTRCT.EXE - DOS / Performs Data Extraction & Creates Intermediate Files

```
              INPUT:  *.ebc        OUTPUT:  *.ebr
                      ebext.tmp             *.crc
                      episys.cdf            *.avr
                      epimaj.cde            *.avc
                      epimin.cde            *.ebs
                      epimon.cde
                      episex.cde  epirte.cde
                      epirce.cde  epiplt.cde
                      epiage.cde  epiocn.cde
                      epibrn.cde  epivar.cde
                      epigrd.cde
```

EMOUT.EXE - WIN / Controls Review of Data Extraction

```
    TIME            INPUT:          OUTPUT:
    SPCT
    TSTRT
    TSTOP
    SSTRT
    SSTOP
    GRAPH -> timeplt.exe
          -> spctplt.exe
    FILE
    SCREEN
    PRINT
    DONE
```

15

TIMEPLT.EXE - DOS / Display Raw Time Series

                  INPUT: *.ebs

SPCTPLT.EXE - DOS / Display Spectral Density

                  INPUT: *.ebs

EMANA.EXE - WIN / Control Multivariate Analysis

    FILE   INPUT: episys.ctl   OUTPUT: episys.ctl
    RUN -> emexec.exe   *.ebc
    CANCEL

EMEXEC.EXE - DOS / Control Multivariate Analysis Sequence

    -> clstprp .exe   INPUT: episys.ctl   OUTPUT: episys.ctl
    -> clstprn ,exe   *.crc   clstmat.dat
    -> discprp1.exe   *.avr   ancvar .row
    -> discprp2.exe   *.avc   ancvar .col
    -> discrim .exe   *.mtd   emtdvr .tbl
    -> dstrata .exe   *.mta   emtavr .tbl
    -> vstrata .exe
    -> twtprn1 .exe
    -> twtprn2 .exe

CLSTPRP.EXE - DOS / Creates Cluster Analysis Intermediate Data

            INPUT: clstmat.dat   OUTPUT: clstdoc.row/col
                                            dendro .row/col
                                            cluster.row/col/tmp

---

CLSTPRN.EXE - DOS / Creates Cluster Analysis Printer Output Files

            INPUT: cluster.row/col OUTPUT: clstden.row/col
                    dendro .row/col   classes.row/col
                                             cluster.row/col

DISCPRP1.EXE - DOS / Creates Discriminant Intermediate Data

            INPUT: clstmat.dat   OUTPUT: discrim.tmp
                    ancvar .row
                    dendro .row

DISCPRP2.EXE - DOS / Creates Discriminant Intermediate Data

            INPUT: discrim.tmp   OUTPUT: discrim.tmp
                    dendro .row

DISCRIM.EXE - DOS / Perform Discriminant Analysis

```
            INPUT:   discrim.tmp    OUTPUT:   discrim.tmp
                                              mdoc*   .row
                                              mplt*   .row
```

DSTRATA.EXE - DOS / Perform Strata Definition

```
            INPUT:   discrim.tmp    OUTPUT:   discrim.tmp
                     stdtrnge.dat             vstr0   .tmp
                                              vstr*   .row
                                              mstr*   .row
```

VSTRATA.EXE - DOS / Determines Strata Sample Sizes

```
            INPUT:   vstr0.tmp      OUTPUT:   vstrata.out
                     vstr* .row
                     ratden.ndx
                     ratden.dat
```

TWTPRN1.EXE - DOS / Creates Two-Way Table Printer Output Files

```
            INPUT:   clstmat.dat    OUTPUT:   twoway.rc
                     classes.row/col
```

TWTPRN2.EXE - DOS / Creates Two-Way Table Printer Output Files

```
            INPUT:   classes.row/col OUTPUT:  twoway.row/col
                     cluster.row/col
                     ancvar .row/col
```

ESOUT.EXE - WIN / Controls Review of Multivariate Analysis Results

```
   CLS  -> escls.exe       INPUT:              OUTPUT:
   TWT  -> estwt.exe
   MDA  -> esmda.exe
   SAM
   RUN
   DONE
```

ESCLS.EXE - WIN / Controls Review of Cluster Analysis Results

```
   INDVAR                  INPUT:              OUTPUT:
   DOC
   DEN
   SCREEN
   PRINT
   GRAPH -> clstplt.exe
   DONE
```

17

CLSTPLT.EXE - DOS / Displays Cluster Analysis

                    INPUT: cluster.row/col
                             classes.row/col   -
                             dendro .row/col

ESTWT.EXE - WIN / Controls Review of Two-Way Tables

    ANCVAR   INPUT: OUTPUT:
    RC
    RA
    CA
    SCREEN -> twtpltl.exe
           -> tstplt2.exe
    PRINT
    DONE

TWTPLT1.EXE - DOS / Displays Row-Col Two-Way Table

                    INPUT: classes.row/col
                             clstmat.dat

TWTPLT2.EXE - DOS / Displays Ancillary Variable Two-Way Tables

                    INPUT: classes.row/col
                             ancvar .row/col
                             clstmat.dat

ESMDA.EXE - WIN / Controls Review of Discriminant Results

    ANCVARS   INPUT: mdoc*.row
    SCREEN
    PRINT
    GRAPH -> discplt.exe
    DONE

DISCPLT.EXE - DOS / Displays Discriminant Results

                    INPUT: clstmat.dat
                             mplt*   .row

ESSAM.EXE - WIN / Controls Sampling Results

    SCREEN   INPUT: vstrata.out
    PRINT
    DONE

EUOPT.EXE - see emopt.exe

EUDEF.EXE - see emdef.exe

18

EUEXT.EXE - see emext.exe

EUOUT.EXE - see emout.exe

EUDSF.EXE - WIN / Select Data Structure File for Data Summary Analysis

    MODEL   INPUT: episys.ctl OUTPUT: episys.ctl
    ACCEPT
    CANCEL

EUDSQ.EXE - WIN / Performs Data Summary Analysis

    VARLIST   INPUT: episys.ctl OUTPUT: *.euq
    EFFECTS   eueff .tbl
    RUN   euvar .tbl
    SCREEN   *.ebd
    PRINT   *.ebe   *.ebv
    DONE   *.ebx

ELANA.EXE - WIN / Controls Limit Analysis

    RUN   -> elexec.exe
    CANCEL

ELEXEC.EXE - DOS / Control Limit Analysis Sequence

    -> elimprp1.exe
    -> elimprp2.exe
    -> elimanal.exe
    -> elimana2.exe

ELIMPRP1.EXE - DOS / Creates Major Limit Analysis Intermediate Data

               INPUT: episys.cdf OUTPUT: elmaj.tbl
                       epimaj.cde   elmaj.tmp
                       epidte.cde

ELIMPRP2.EXE - DOS / Creates Minor Limit Analysis Intermediate Data

               INPUT: episys.cdf OUTPUT: elmin.tbl
                       epimin.cde   elmin.tmp
                       epidte.cde

ELIMANA1.EXE - DOS / Performs Major Limit Analysis

               INPUT: elmaj .tbl OUTPUT: elmaj.out
                       elmaj .tmp   elmaj.*
                       epimon.cde

19

ELIMANA2.EXE - DOS / Performs Minor Limit Analysis

```
        INPUT:  elmin .tbl   OUTPUT:  elmin.out
                elmin .tmp       -     elmin.*
                epimon.cde
```

ELOUT.EXE - WIN / Controls Review of Limit Analysis Results

```
    MAJORSELECT            INPUT:   elmaj.*
    MINORSELECT                     elmin.*
    MAJORGRAPH                      elmaj.tbl
    MINORGRAPH                      elmin.tbl
    MAJORSCREEN -> elimpltl.exe
    MINORSCREEN -> elimplt2.exe
    MAJORPRINT
    MINORPRINT
    DONE
```

ELIMPLT1.EXE - DOS / Displays Major Limit Analysis Results

```
        INPUT:  elmaj.*
                elmaj.tbl
```

ELIMPLT2.EXE - DOS / Displays Minor Limit Analysis Results

```
        INPUT:  elmin.*
                elmin.tbl
```

20

R.3 Common Data Format (CDF) File – EPISYS.CDF

The following is an ASCII depiction of the CDF file. As implemented, the actual CDF file is in binary format.

R.3.1 EPISYS.CDF – ASCII Record Format

Column	1	2	3	5	6	7	9	11	13	18	27	32	37	38	39	44
Variable	S E X	R C E	A G E	B R N	G R D	R T E	P L T	O C N	T R T DATE	S S N	T R T UIC	D T Y UIC	V I S NUMB	R T N DUTY	N H R CODE	C L S
Sample Data	1	1	25	1	1	81	1	3	29219	999999999	0	68084	1	1	47500	8
	1	1	25	1	1	81	1	8	29219	999999999	11388	68097	1	1	99410	17
	1	1	25	1	1	81	1	8	29219	999999999	11388	68097	1	1	20150	2
	1	1	25	1	1	81	1	8	29219	999999999	11388	68097	1	1	95520	17
	1	1	25	1	1	81	1	8	29219	999999999	11388	68097	1	1	81700	17
	1	1	25	1	1	81	1	8	29219	999999999	11388	68097	1	1	99000	17
	1	1	25	1	1	81	1	8	29219	999999999	11388	68097	1	1	20160	2
	1	1	25	1	1	81	1	8	29219	999999999	11388	68097	1	1	95520	17
	1	1	18	1	1	39	2	1	29219	262498330	351	00203	1	1	38420	6
	1	1	41	1	1	65	27	6	29219	448340193	69	66096	1	1	81600	17

R.3.2 EPISYS.CDF – Binary Format

```
struct CDFRECORD
   {
   unsigned char   sex;          char              ssn[9];
   unsigned char   rce;          char              duic[5];
   unsigned char   age;          char              tuic[5];
   unsigned char   brn;          unsigned char     vnumb;
   unsigned char   grd;          unsigned char     rtdty;
   unsigned char   rte;          char              nhrccode[5];
   unsigned char   plt;          unsigned char     majcode;
   unsigned char   ocn;          unsigned char     mincode;
   long            tdate;        };
```

21

APPENDIX F

PROTOTYPE REPORT PLANS

Prototype Report Plan: A NINE-YEAR PROFILE OF ACCIDENT AND INJURY HOSPITALIZATIONS

E.K.E. Gunderson, Ph.D. & A.D. Unseth, M.A.

Problem

Accidents and injuries are responsible for a significant percentage of hospital admissions among enlisted U.S. Navy personnel. Optimal military readiness requires that these hospitalized individuals be effectively treated and returned to duty as soon as possible. The approximate length of hospital stay for accidents and injuries should be of interest to commanding officers.

Objective

The purpose of this present study was to develop a profile of accident and injury hospitalizations over a nine-year period. This study would identify the lengths of hospital stays during first enlistments of Navy personnel from 1980 through 1988. Our goal was to identify trends of specific diagnoses that would serve as possible projections of future hospital stays for accidents and injuries.

Approach

Data used for this study consisted of medical inpatient and career history information extracted from the CHAMPION Research Database maintained at the Naval Health Research Center in San Diego, CA. All personnel who enlisted between 1980 and 1988 were identified from career history files. Their records of hospital admissions for traumatic injuries during their first four-year enlistment period were extracted for the period 01 January 1980 to 31 December 1992. To examine the temporal impact on length of hospitalization, the population was divided into nine cohort groups of personnel who enlisted from 1980 to 1988. The variable included diagnosis, sex, age, occupation, activity code, cause code, occupationally related, term of enlistment, loss code, and surgical procedure.

UNIVARIATE EFFECTS SUMMARY: Sex - Age

Accidents/Poisoning/Violence
Cases per 10000 Person-Years at Risk
Confidence Level: 95.00%

		No of Cases	Per-Yrs at Risk	Incidence Rate	Confidence Limits Lower	Upper
Male	17-19	21251	765344	277.67	273.93	281.40
	20-21	38303	1265849	302.59	299.56	305.62
	22-24	38178	1440172	265.09	262.43	267.75
	25-29	28196	1406711	200.44	198.10	202.78
	30-34	13446	900872	149.26	146.73	151.78
	35-39	7784	627192	124.11	121.35	126.87
	40-44	2807	254908	110.12	106.04	114.19
	45-61	961	78235	122.84	115.07	130.60
	Total	150926	6739284	223.95	222.82	225.08
Female	17-19	1954	75262	259.63	248.11	271.14
	20-21	2545	129560	196.43	188.80	204.06
	22-24	2705	164836	164.10	157.92	170.28
	25-29	2360	164932	143.09	137.32	148.86
	30-34	1131	85473	132.32	124.61	140.03
	35-39	516	36742	140.44	128.32	152.55
	40-44	123	10072	122.12	100.53	143.66
	45-61	34	2553	133.18	88.42	177.74
	Total	11368	669429	169.82	166.69	172.94
Total		162294	7408712	219.06	217.99	220.12

UNIVARIATE EFFECTS SUMMARY: Sex - Grade

Accidents/Poisoning/Violence
Cases per 10000 Person-Years at Risk
Confidence Level: 95.00%

		No of Cases	Per-Yrs at Risk	Incidence Rate	Confidence Limits Lower	Upper
Male	E1	13138	495472	265.16	260.63	269.69
	E2	21846	611240	357.40	352.67	362.14
	E3	34142	1078561	316.55	313.19	319.91
	E4	33816	1358653	248.89	246.24	251.55
	E5	25597	1372202	186.54	184.25	188.82
	E6	15395	1131406	136.07	133.92	138.22
	E7	4930	483872	101.89	99.04	104.73
	E8	1427	143173	99.67	94.50	104.84
	E9	635	64726	98.11	90.47	105.73
	Total	150926	6739304	223.95	222.82	225.08
Female	E1	1415	54169	261.22	247.61	274.82
	E2	1790	67308	265.94	253.62	278.26
	E3	3072	154066	199.40	192.34	206.45
	E4	2487	159273	156.15	150.01	162.28
	E5	1729	145230	119.05	113.44	124.66
	E6	685	70091	97.73	90.41	105.05
	E7	158	16014	98.66	83.27	114.02
	E8	29	2728	106.31	67.64	144.81
	E9	3	530	56.57	0.00	113.13
	Total	11368	669408	169.82	166.70	172.94
Total		162294	7408712	219.06	217.99	220.12

Accidents/Poisoning/Violence
Cases per 10000 Person-Years at Risk
Confidence Level: 95.00%

		No of Cases	Per-Yrs at Risk	Incidence Rate	Confidence Limits	
					Lower	Upper
Male –	CV	9183	352872	260.24	254.91	265.56
	CVN	3703	184369	200.85	194.38	207.31
	BB/CG	4416	169937	259.86	252.20	267.52
	CGN	1567	69123	226.70	215.47	237.92
	DD/FF	17497	587055	298.05	293.63	302.46
	SURFACE	601	20549	292.47	269.08	315.84
	ASSAULT	9479	340391	278.47	272.87	284.08
	SUPPORT	8263	327144	252.58	247.13	258.02
	REPLENSH	5342	190035	281.11	273.57	288.64
	CARGO	0	67	0.00	0.00	0.00
	SS	145	4681	309.76	259.32	360.10
	SSN	2645	162992	162.28	156.09	168.46
	SSBN	2081	132481	157.08	150.33	163.83
	AUX	475	23621	201.09	183.00	219.16
	MISC	8	827	96.76	30.19	162.91
	OTHER	25	1363	183.47	111.61	254.98
	ASHORE	85496	4058619	210.65	209.24	212.06
	UNKNOWN	0	113180	0.00	0.00	0.00
	Total	150926	6739304	223.95	222.82	225.08
Female	CV	3	357	84.00	0.00	167.99
	CVN	0	132	0.00	0.00	0.00
	BB/CG	0	1	0.00	0.00	0.00
	CGN	0	7	0.00	0.00	0.00
	DD/FF	11	368	299.19	123.15	474.14
	SURFACE	0	245	0.00	0.00	0.00
	ASSAULT	1	157	63.51	0.00	127.02
	SUPPORT	1225	61159	200.30	189.08	211.51
	REPLENSH	150	6321	237.30	199.30	275.21
	CARGO	0	13	0.00	0.00	0.00
	SSN	0	226	0.00	0.00	0.00
	SSBN	0	625	0.00	0.00	0.00
	AUX	8	489	163.64	51.06	275.51
	MISC	0	69	0.00	0.00	0.00
	OTHER	0	21	0.00	0.00	0.00
	ASHORE	9970	581274	171.52	168.15	174.89
	UNKNOWN	0	17943	0.00	0.00	0.00
	Total	11368	669408	169.82	166.70	172.94
Total		162294	7408712	219.06	217.99	220.12

Prototype Report Plan: COMPREHENSIVE GENDER-SPECIFIC ASSESSMENT
OF ILLNESSES AND INJURY INCIDENCE RATES

Problem

Certain illnesses are known to have higher incidence and hospitalization rates in women than in men, while some disorders may have higher rates in men. No previous study in military has comprehensively identified the overall incidence of illnesses that are more common in women compared to men, since previous studies have been limited to a single data source. Comprehensive incidence rates would be useful in planning preventive strategies, and in providing adequate and appropriately trained treatment personnel and facilities for both genders.

Objective

The purpose of this study is to provide a comprehensive assessment of incidence of disease by gender in active-duty Navy personnel. This assessment will incorporate hospitalization data from the CHAMPION Research Database, the Shipboard Automated Medical System (SAMS) in use aboard selected ships, other shipboard medical data, and outpatient data from Naval Medical Center outpatient visit tapes.

Approach

The CHAMPION Research Database will be used to identify the 250 most common disease accounting for hospitalization of active-duty Navy personnel during 1990-1994. First and subsequent hospitalization rates will be examined by gender, age, race, and, for shipboard personnel, platform type. In addition, the SAMS system will be used to identify the 100 most common disease diagnoses accounting for sick call visits or medevac during deployment; the 100 most diagnoses accounting for sick call visits at other times; and the 100 most common illnesses accounting for outpatient visits at Navy Hospitals in San Diego, Bethesda (NNMC), and Portsmouth. In addition, this study will integrate data from inpatient, sick call, and outpatient computer-based records to provide the most comprehensive analysis possible of incidence of disease in Navy women. Covariates will include occupation (rating), pay grade, work division, and activity code. This study will also examine length of hospitalization for the most common diseases, and discharges from the Navy subsequent to those diagnoses, in order to identify the diagnoses that account for the greatest loss of time and personnel, according to gender and reason for loss (Navy and Department of Defense loss codes).

Background

A previous study examined gender-specific sick call visit rates based on manually-maintained research sick call logs (1, 2), and another study used extracts of women's hospitalizations from the Navy Enlisted Career History File (3). According to reports by Hoiberg, the overall hospitalization rate for Navy enlisted women was approximately twice that of enlisted men (4, 5) (hospitalizations for pregnancy appear to have been included in those estimates). Preliminary data suggest that during 1980-1992 the overall hospitalization rate for Navy enlisted women was approximately 2.5 times that of enlisted men (Gunderson EKE, Unseth A. Personal communication, 1995). The existing studies have not attempted to link two or more major data bases. Both studies were completed before routine assignment of women to aircraft carriers and other combat ships.

Preliminary Data

The CHAMPION Research Database was used to identify first hospitalization rates of several diseases believed to be more common in women, or that occur only in women, for purposes of preliminary analysis. The time interval was 1980-1993. First hospitalization rates of these diseases were then computed by gender (Table 1). Supplementary analyses were performed according to age, race, occupation (rating) and platform (aircraft carrier-nuclear, aircraft carrier-nonnuclear, battleship, destroyer, submarine, ashore, etc.)(not shown).

The preliminary data revealed two relatively common behavioral or mental disorders with significantly higher first hospitalization rates in women, specifically, adjustment reactions and personality disorders (Table 1). By contrast, the incidence of hospitalization for alcohol dependence syndrome was slightly, but nonsignificantly, lower in women. The incidence rate of cholelithiasis was 4.4 times higher in women, and the first hospitalization rate for acquired deformities of the toes was seven times higher in women than men. The higher rate of cholelithiasis is consistent with the higher hospitalized incidence rate of this disorder in women than men in the civilian population. Hospitalization for pelvic inflammatory disease and endometriosis was common in women.

Research Plan

Gender-specific first hospitalization rates

The project will identify the 150 diseases accounting for the most first hospitalizations in both genders, and the 150 most common diagnoses within each gender. Ratios of female to male rates will be calculated. Diseases with significantly higher rates in either gender will be identified. These will be further analyzed by age, pay grade, occupation (rating), platform, and other covariates in order to determine if the observed differences can be accounted for by differences in covariates. The analyses will include person-years and multiple logistic regression techniques to help isolate sources of variation.

Gender-specific combined sick call, medevac, and hospitalization rates

A cohort of women and men will be identified for whom both SAMS and CHAMPION data are available. These data will be made available from the companion shipboard study. The time intervals for which SAMS data are available will be used to define a subset with both SAMS and hospitalization data. This subset will be used to analyze the combined data on sick call visits, medevacs, and hospitalizations.

Gender-specific combined outpatient and hospitalization visit rates

Using the CHAMPION Research Database, a cohort of active-duty women and men will be identified who are assigned to units located within the defined catchment areas of the outpatient departments of Navy hospitals in San Diego, Bethesda (NNMC), and Portsmouth, and have lived in the area for at least one year preceding the years of study. Outpatient visit rates will be determined using a person-years approach according to gender, age, pay grade, occupation (rating), race, and other characteristics, and the 100 diagnoses accounting for the most outpatient visits will be determined, along with gender ratios. This approach will take into account different amounts of time that each patient is assigned to the catchment area. The outpatient data for the individuals in the defined geographic areas will be incorporated into the CHAMPION Research Database for a more comprehensive analysis of incidence of disorders requiring either hospitalization or referral to a hospital outpatient department within the defined catchment areas, and incidence rates including both outpatient diagnoses and hospitalizations will be estimated. For this purpose, second and subsequent visits or hospitalizations for chronic disorders will be excluded in order to prevent duplicate counting of incidence. This will be done by examining all outpatient visits and hospitalizations for each patient during the previous year. Rates also will be analyzed according to time and distance in miles from the patient's base and residence to the facility, and, where necessary, data from branch clinics will be incorporated into the analyses. This project will be valuable in identifying diseases that are serious enough to require the specialty care provided in hospital outpatient departments, but which do not necessarily result in hospitalization. Examples include a wide range of female menstrual and reproductive disorders, endometriosis, arthritis, migraines, and early manifestations of cardiovascular and renal diseases.

Technical reports

This project will produce three technical reports that will be designed to serve as prototypes for future tri-service reports based on the Centralized Tri-service Relational Database. Each report will incorporate templates for the production of statistical tables and will provide detailed examples of statistical analysis procedures, including the use of person-years

and multiple logistic regression. A prototype also will be provided using Cox proportional hazards regression. Programming used in the calculations will be preserved for future tri-service use.

(1) **Comprehensive Gender-Specific Rates of Disease in Navy Women and Men**
This report will identify the diseases that have significantly higher incidence rates in each gender and will suggest interventions that might help to reduce the gradient in risk between the two genders. It will also identify areas where changes may be desirable to meet the medical needs that arise more often in women.

(2) **Linkage of SAMS with the CHAMPION Research Database**
This report will provide details on the methods and procedures used to link the SAMS database with the CHAMPION Research Database, and will recommend how each system might be modified to enhance the success and value of linkage. It will describe the format and availability of the newly linked data made available during the project.

(3) **Linkage of Outpatient Visit Tapes with the CHAMPION Research Database**
This report will provide details on the methods and procedures used to link the Outpatient Visit Tapes from Navy hospitals with the CHAMPION Research Database, and, as above, it will recommend any modifications to the format of Outpatient Visit Tapes to enhance linkage with the CHAMPION Research Database. It also will evaluate the extent to which data from branch clinics should be incorporated into the database for a more comprehensive identification of illnesses in Navy personnel in defined geographic areas.

Table 1. Incidence rates of first hospitalization for selected diagnoses per 100,000 person-years, by diagnosis and gender, U.S. Navy enlisted personnel, 1990-1993

Diagnosis	Women		Men		Ratio of rate in women to rate in men	
	No.	Rate	No.	Rate	Ratio	p
Cholelithiasis (ICD-9 574)	638	104.5	1,491	23.8	4.4	0.001
Adjustment reactions (ICD-9 309)	2,371	388.4	11,475	183.2	2.1	0.001
Personality disorders (ICD-9 301)	3,408	558.4	21,862	349.0	1.6	0.001
Acquired deformities of the toes (ICD-9 735)	353	57.8	522	8.3	7.0	0.001
Pelvic inflammatory disease (ICD-9 614)	2,798	458.4	—	—	—	—
Endometriosis (ICD-9 617)	1,110	181.9	—	—	—	—
Alcohol dependence syndrome (ICD-9 303)	48	7.9	553	8.8	0.9	NS

References

1.   Nice S, Hilton S. Sex differences in health care
requirements aboard U.S. Navy ships. Technical Report No. 90-2.
San Diego: Naval Health Research Center, 1990.

2.   Nice D, Hilton S. Sex differences and occupational
influences on health care aboard U.S. Navy ships. Milit Psychol
1990;6:109-23.

3.   Hoiberg A. Health status of women in the military. Health
Psychology 1984;3:273-87.

4.   Hoiberg A. Health care needs of women in the Navy. Mil Med
1979;144:
103-9.

5.   Hoiberg A. Sex and occupational differences in
hospitalization rates among Navy enlisted personnel. J Occup Med
1980;22:685-90.

APPENDIX G

CONGRESSIONAL ACTIONS

CONGRESSIONAL ACTIONS ON FY 1994 BUDGET
TABLE 1

PRESIDENT'S BUDGET	HASC Report 103-200, 7/30/93	SASC	HAC Report 103-254. 9/22/93	SAC Report 103-153, 10/04/93	JOINT AUTHORIZATION Report 103-357, 11/10/93	JOINT APPROPRIATION
No request	+20M	None	+$40M	None	+20M	+$40M - special interest
	Page 181 -. Committee is concerned with the dearth of medical research and study of the unique medical problems related to female members of the armed forces as well as other women eligible for medical services from the department... ...recognizes that women in the military continue to face a host of health issues, related to combat and other in-line-of-duty situations, including stress, exposure to toxins, reproductive health, menopause, mental health and sexual violence. Many issues are of unique concern to women in the military, but have been overlooked by the military medical research and service provider community. The expanding population of women in the military offers a distinctive and reliable number of potential subjects for long-term, gender-specific research studies. Studying this cohort and monitoring the military medical care system for gender-specific issues will provide the military with valuable clinical data for both military and civilian women. To address this problem...recommends the establishment of a Defense Women's Health Research Center. These provisions would further require that clinical medical research conducted or supported by the department shall include women and members of minority groups, and that data collected by such research be coded to allow for analysis of gender or racial differences among subjects.	None	Page 192 - The Committee has recommended $40,000,000 only to be used for research on women's health issues related to service in the armed forces.	Page 375 - The Committee directs the Department to provide a report evaluating the provision of preventive and primary health care services through military medical treatment facilities and the Civilian Health and Medical Program of the uniformed services to female members of the uniformed services and female covered beneficiaries eligible for health care under chapter 55 of title 10, United States Code. This report shall include a description of the demographics of the population, the leading categories of morbidity and mortality, a description of the health care providers employed in providing health care, and descriptions of programs the Department has in place or plans to implement to assess the health needs of women.	Page 612 - The conferees agree that the Secretary of Defense may establish a women's health research center at an existing DoD medical center .... The conference agreement would authorize an additional $20.0 million of fiscal year 1994 defense research funds in PE 63002A for establishment of the center or for medical research relating to women's service in the military at existing DoD medical centers, should the Secretary choose not to establish the center. The conferees agree that the purpose of this funding is to provide a coordinated effort for medical research within DoD on women's health issues in relation to women's service in the military. The Department of Defense must spend this funding for that purpose under a single coordinating agent within DoD. Statutory Requirements are on Page 63.	Page 110 - DD Form 1414 for fiscal year 1994 shall show the items marked with an asterisk ("*") as Congressional interest items, a change to which requires prior approval.

Table 1 - Page 1

CONGRESSIONAL ACTIONS ON FY 1995 BUDGET
TABLE 2

PRESIDENT'S BUDGET	HASC Report 103-449, 5/10/94	SASC Report 103-282, 6/14/94	HAC Report 103-562, 6/27/94	SAC Report 103-321, 7/29/94	JOINT AUTHORIZATION Report 103-701, 8/12/94	JOINT APPROPRIATION Report 103-747, 9/26/94
No Request	+$40M	+$40M to PE 63002D	+40.0M	+40M	+40M	+40M
	Page. 145 - At a time of women's growing presence and new role in the military, the committee is concerned with the dearth of medical research and study of the unique medical problems relating to female members of the armed forces and other women eligible for medical services from the Department.

The Department of Defense has established a tri-service research program with the Army acting as the executive agency for implementation of this research. The committee commends the Department and the ... (USAMRDALC) for its development of a strong program that focuses on: epidemiological research and data base development; policies and standards issues; and solutions-oriented research. The committee applauds the Department and the Army for its rapid development of a program that minimizes overhead costs and will, if sustained, add significantly to the quality of life of women service members, add to the readiness of the forces, and add to women's medical care.

This section would authorize $40.0 million in PE 603002A to continue this program. | Page 104 - The committee supports the decision ...to carry out medical research relating to the service of women in the military in a decentralized fashion rather than through... a center...supports the proposed tri-Service research program on women's health with the Army ...as the executive agency. ...recommends a provision that would provide a statutory charter for the program...adds $40.0 million to PE 63002D to continue the program...clear to the committee that the increasing participation of women in the military...created new requirements for medical research. These requirements span the military services and are insufficiently addressed by the much larger medical research programs of the Department of Health and Human Services (IHS), which focus on the general health care needs of the American population.

Requirements include research on combat stress and trauma, on exposure to toxins and environmental and occupational hazards associated with military service, and on patterns of illness in military servicewomen.

CONTINUED | Page 273 - The Committee has included $40,000,000 for the Defense Women's Health Program. The Committee notes that Magee-Women's Hospital in Pittsburgh is a national leader in addressing women's health problems and encourages the Department of the Army to work with the hospital as it develops and implements this program. | Page 238 - ...the Committee approves $40,000,000 to continue the Defense Women's Health Program.

Page 355 - The Committee directs that a portion of the funding for the Defense Women's Health Program be used for a comprehensive preventive research program on Paget's disease, osteoporosis, osteogenesis imperfecta, and related bone diseases.

CONTINUED | Page 41 - (Note: Statutory basis for program continuation)
Sec. 241. Defense Women's Health Research Program.

(a) ...The program shall continue to serve as the coordinating agent for multi-disciplinary and multi-institutional research within the Department of Defense on women's health issues related to service in the Armed Forces. The program shall continue to coordinate with research supported by other Federal agencies that is aimed at improving the health of women.

(b)... The Departments of the Army, Navy and Air Force shall each participate in the activities under the program.

(c)...The Secretary of Defense shall designate the Secretary of the Army to be the executive agent for administering the program.

CONTINUED | No language |

Table 2 - Page 1

TABLE 2 CONTINUED

PRESIDENT'S BUDGET	HASC Report 103-449, 5/10/94	SASC Report 103-282, 6/14/94	HAC Report 103-562, 6/27/94	SAC Report 103-321, 7/29/94	JOINT AUTHORIZATION Report 103-701, 8/12/94	JOINT APPROPRIATION
		The key to the defense women's health program, as it is for the rest of the DoD medical research program, is to focus limited DoD resources on the specialized needs of service members related to their military service and to leverage, not duplicate, the $11.5 billion annual research program of the National Institutes of Health and the $2.0 billion annual investment of the Centers for Disease Control and Prevention. The Committee is especially concerned, for example, that DOD conduct adequate research into the possible mental and physical threats that women may face if they become prisoners of war.		Page 355 - The Committee urges the Defense Women's Health Program to work closely with the National Institute of Arthritis, the lead Institute on bone diseases. Page 356 - The Committee instructs the Department of Defense to ensure that the Women's Health Research Program support at least two research centers within schools of social work in communities with large concentrations of military families (including the University of Hawaii). The centers would conduct research on the impact on the health functioning of women in the military of psychosocial factors resulting from family violence, military deployment, and downsizing, with special attention to research on intervention strategies undertaken by social workers as primary providers of health care to military families.	Sec 241 (continued) (d) ... If the Secretary of Defense intends to change the plan for the implementation of the program previously submitted to the Committees on Armed Services of the Senate and House of Representatives, the amended plan shall be submitted to such committees before implementation. (e) ... The program shall include the following activities regarding health risks and health care for women in the Armed Forces: (1) The coordination and support activities described in section 251 of Public Law 103-160. (2) Epidemiologic research regarding women deployed for military operations, including research on patterns of illness and injury, environmental and occupational hazards (including exposure to toxins), side-effects of pharmaceuticals used by women so deployed, psychological stress associated with military training, deployment, combat and other traumatic incidents, and other conditions of life, and human factor research regarding women so deployed. (3) Development of a data base to facilitate long-term research studies on issues related to the health of women in military service, and continued development and support of a woman's health information clearinghouse to serve as an information resource for clinical, research, and policy issues affecting women in the Armed Forces. (4) Research on policies and standards issues, including research supporting the development of military standards relating to training, operations, deployment, and retention and the relationship between such activities and factors affecting women's health. (5) Research on interventions having a potential for addressing conditions of military service that adversely affect the health of women in the Armed Forces. (f) ... Of the amount authorized to be appropriated pursuant to section 201, $40,000,000 shall be available for the Defense Women's Health Research Program referred to in subsection (a).	

Table 2 - Page 2